The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

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On Whiteness in Commerce

UNCOLOURED, hueless, water-white are all terms which in several aspects of daily life have come to denote quality, excellence. Hence they have been used in connection with chemicals, both pure and commercial, and it has come to pass that the manufacturer spends money to bleach, blanch, or decolorise his product. The association in the public eye of purity with whiteness must obviously be humoured, and for many purposes such purity is desirable, nay, essential. But the question may fairly be asked whether in other instances the standards of colour are not unreasonable, having in mind that the commercial chemical is almost immediately used in admixture with coloured substances to give a coloured product.

We have in mind many of the ester solvents for nitrocellulose; acetone, in its many applications; materials used in foods, like lactic acid, which must not only be pure but, in addition, water-white, though they are blended with coloured substances. Olein is another example, an unduly pale product being demanded for a number of uses; fats and oils, both edible and for soap, have to be colourless. We propound the question as appropriate for discussion whether, in these as in dozens of other similar cases which our readers can supply, unnecessarily high standards of colour are not being imposed by the buyer. After all, this colour is as a rule only obtained by bleaching the otherwise finished product, sometimes at quite considerable cost. The money spent in the aggregate on bleaching must be large: makers of chlorine, of sulphur dioxide, of fullers' earth, of peroxides, even of absorbent carbon, vie with one another for patronage.

The art and science of bleaching is well developed; it is in able hands and it will continue to progress, for the particular theme we are adumbrating will in no way affect the need to decolorise in thousands of instances. We are concerned only to suggest that often the degree of pallidity required is unnecessarily high and that it is only attained at some cost and sometimes to the detriment of the British manufacturer. As manufacturers, we shall continue to strive for perfection: to be as white as snow, as a sheet, as the lily, shall be our ambition in our products, provided always that their usage justifies this standard.

Institute Activities

THE Institute of Chemistry has latterly had under consideration certain problems of more than usual interest. The first of these is the old difficulty of adopting an authoritative and distinctive name that members may use, the legal right to the term "chemist" being reserved to members of the Pharmaceutical Society, though that Society does not strictly enforce the limitation. The Institute is now considering the presentation of a petition for the grant of a supplementary charter with the object of securing a title to distinguish chemists, as represented by the Institute, from pharmacists. The pharmacists, although possessing an exclusive statutory right to the title "chemist," are fortunately well disposed to the Institute, and have never made any formal objection, so far as we know, to Institute members being so described. At the same time, they may not be too ready to surrender a title they have long enjoyed and accepting in its place the more correct designation "pharmacist." The difficulty will, therefore, be to hit on the right name. The Institute, however, is usually tactful in these delicate matters and will not be likely to proceed until its case is fairly clear. It is, of course, common knowledge that members of the Institute, as analysts, research chemists, works control chemists, and managers in the drug industry, have almost as much to do with poisons as the pharmacists themselves, and the Institute is now claiming representation on the central authority or board for the preparation of the Poisons List, and power to advise or assist the Home Secretary in making rules governing the sale, wholesale or retail, and supply of poisons.

Another matter that the Institute is investigating is the state of unemployment among Institute members. The total number returned as unemployed on

October 27, 1930, was 94, the highest figure since September, 1929, when it was 62. Of the 94, 80 are associates and 14 fellows, and of the total number three are women. The total membership of the Institute being about 5,750, the percentage of unemployed works out at a little over 1'6. Without regarding the position as "unduly alarming," the committee considers it possible that the number of unemployed may rise further in the future. Anxious as the Institute is to secure posts for qualified British chemists, it confesses that difficulty has been experienced in several cases in obtaining suitable candidates for appointments—notably for public appointments in the East, and for chemists with experience in the edible-oil industry for Africa. In cases where employers were desirous of obtaining licences to engage alien chemists, inquiries have been made of the Institute as to suitable men with particular experience, but in nearly all such cases the requirements are so framed that they are only applicable to the selected alien and therefore very difficult to meet. Some ten years ago the Institute compiled an extremely useful return of the terms and conditions of members' appointments. When in 1927 an effort was made to obtain a similar return, the response was so poor that it was not considered worth while to publish the results. Another attempt is now to be made to obtain a representative return, and "those in good positions" are specially asked to co-operate.

The Central Headquarters Scheme

WE write on the eve of the dinner at Guildhall, to meet the Prince of Wales, which the Association of Scientific and Technical Institutions is organising in connection with the scheme for a central headquarters for a number of scientific bodies. As a means of inaugurating this movement the occasion and the method have been admirably chosen. In addition to a large and powerful group of mining, metallurgical, fuel and other organisations, the Chemical Society, the Society of Chemical Industry, the Institution of Chemical Engineers, and the Association of British Chemical Manufacturers are included among the constituents of the newly incorporated institution. The presence of the Prince of Wales, whose speeches on such occasions are a great attraction and always worth hearing, gives a special distinction to the gathering, and the Association has been fortunate to obtain the use of Guildhall. The guests will be received by Sir Ernest Rutherford (the chairman) in the Art Gallery, the Prince will be received by the distinguished company standing at 7.50, and grace will be said by the Bishop of Birmingham, himself a Fellow of the Royal Society. Few movements of recent times have been inaugurated under more dignified conditions.

Books Received

MY FRIEND MR. EDISON. By Henry Ford with Samuel Crowther. London: Ernest Benn, Ltd. Pp. 94. 6s.

SCIENCE AND MODERN INDUSTRY. By Sir William J. Pope. The Norman Lockyer Lecture. London: Brisih Science Gulid. Pp. 20. 1s.

PATENTS, TRADE MARKS AND DESIGNS. By H. T. P. Gee. London: Gee and Co. Pp. 47. 5s.

ELEMENTARY QUANTITATIVE ANALYSIS. By William Briggs and W. H. Bausor. Revised by D. R. Snelgrove. London: University Tutorial Press, Ltd. Pp. 125. 3s.

A TEXT-BOOK OF ORGANIC CHEMISTRY. By A. F. Holleman. London: Chapman and Hall, Ltd. Pp. 594. 17s. 6d.

THE CHEMICAL INVESTIGATION OF PLANTS. By Dr. L. Rosenthaler. Translated by Sudhamoy Ghosh. London: G. Bell and Sons, Ltd. Pp. 197. 12s. 6d.

THE MATERIALS OF LIFE. By T. R. Parsons. London: George Routledge and Sons, Ltd. Pp. 288. 10s. 6d.

COKE FOR BLAST FURNACES. By R. A. Mott and R. V. Wheeler. London: The Colliery Guardian Co., Ltd. Pp. 267. 25s.

The Calendar

Nov.		
17	Chemical Industry Club: "Liberia." Lieut.-Colonel Powney. 8 p.m.	2, Whitehall Court, London.
17	Institute of Chemistry (Bristol Section): "Some Thallium Compounds." Dr. R. C. Menzies. 7.30 p.m.	University, Bristol.
18	Newcastle Chemical Industry Club: "Bitumen. Its Application and Testing." W. N. Bowran. 7.30 p.m.	Newcastle.
18	Society of Chemical Industry (Glasgow Section): "Experiences with Blast Furnace Tar." Dr. A. Jacques.	Royal Technical College, Glasgow.
18	Society of Chemical Industry (Birmingham Section): "Stoneware in the Chemical Industry." F. Weinreb. 6.45 p.m.	Chamber of Commerce Buildings, New Street, Birmingham.
19	Research Association of British Paint, Colour and Varnish Manufacturers: Luncheon, 1.15 p.m.	Holborn Restaurant London.
19	Institute of Chemistry (Birmingham and Midlands Section): "The Photosynthesis of Carbohydrates and the Chemistry of Life." Professor E. C. C. Baly.	University, Birmingham.
20	Institute of Metals (London Section): "Some Non-Ferrous Metals in Chemical Engineering." Dr. Richard Seligman. 7.30 p.m.	Royal School of Mines, South Kensington, London.
20	Chemical Society. 8 p.m.	Burlington House, London.
20	Institution of the Rubber Industry: "The Evaluation of Raw Rubber." G. Martin. 7 p.m.	"The Manchester Ltd.," Royal Exchange, Manchester.
21	Society of Dyers and Colourists: "Properties of Insoluble Azo Colours on the Fibre." Professor F. M. Rowe.	London
21	Institute of Chemistry (Leeds Area Section): The Annual General Meeting.	Leeds.
21	Society of Chemical Industry (Liverpool Section): "Nicotine." Dr. J. H. Reid. 6 p.m.	University, Liverpool.
21	Institute of Brewing. Horace Brown Memorial Lecture: "The Culture of Barley for Brewing." Dr. Beaven. 8.15 p.m.	Institution of Electrical Engineers, Victoria Embankment, London
21	Society of Dyers and Colourists (Manchester Section): "Some Remarks on the Treatment of Aniline Black Subsequent to Ageing." Dr. J. L. Hankey. 7 p.m.	Literary and Philosophy Society, George Street, Manchester.
21	Physical Society: 5 p.m.	Imperial College of Science, South Kensington, London.
21	Institute of Chemistry: Streatfeild Memorial Lecture. Bernard F. Howard. 8 p.m.	30, Russell Square, London.
21	West Cumberland Society of Chemists and Engineers: Social Evening. 7 p.m.	Workington.
22	British Association of Chemists. Annual Dinner. 6.45 p.m.	Adelphi Hotel, Liverpool.
22	Oil and Colour Chemists' Association (Manchester Section). Annual Dinner and Dance.	"Manchester, Ltd." Manchester.
26	Royal Society of Arts: "The Chemical Constitution of Coal." Professor W. A. Bone. 8 p.m.	John Street, Adelphi, London.
26	Society of Dyers and Colourists (Midlands Section): J. G. Grundy. 7.45 p.m.	Globe Hotel, Silver Street, Leicester.

Prince of Wales and John Benn Hostel

A Memorable Evening Among the Boys

THE PRINCE OF WALES'S visit to the John Benn Hostel on the evening of Wednesday, November 5, was an historic incident. On two previous occasions His Royal Highness had honoured with his presence this home for homeless boys—once when he performed the opening ceremony, and again when the organisation was in full swing and he was able to see the boys at play. The third visit was made at his own suggestion. He asked to be a guest at the boys' supper and stipulated that it really was to be a boys' supper and not some specially prepared banquet smuggled into the building from outside. And it was this delightfully conceived scheme that was put into effect.

The Prince's Welcome

By a curious chance, which somehow enhanced the informality of the whole affair, the hostel lighting suddenly gave out just two minutes before the arrival of the royal party. The necessary repairs were effected in less than a quarter of an hour, but meanwhile the smiling Prince had been received by Sir Ernest Benn, the Earl of Feversham, and Mr. Wedgwood Benn, and with the aid of candles and electric torches had already inspected the guard of honour composed of scouts, girl guides, cubs and brownies, and was making a tour of the play centres in the Milner Hall. Here the children of the district had prepared a number of very tasteful tableaux to which the Prince was conducted by a little girl dressed as Puck. The Prince, who knows something of aviation, had a technical discussion with a small boy who was building a model biplane. The Prince expressed doubts about the dimensions of the body and the wing-span, but, on being shown the working drawings, cheerfully acknowledged that the young rigger was following them accurately.

The Prince next witnessed an interesting display in the swimming bath, and then attended the initiation of a new member of the Stepney Branch of Toc H.

Throughout the evening there were prolonged cheers as each fresh room was entered, but none reached the height of enthusiasm which greeted the Prince's arrival at the Supper Hall. The royal visitor, with Sir Ernest and the Earl of Feversham, entered to find the company, 120 in number, already standing in their places at tables gay with decorations of little tents and camp fires. The supper party consisted of seventy boys and the following guests:—

Major J. R. Aird, Mr. Percy Alden, Sir Ernest J. P. Benn, The Rt. Hon. Wedgwood Benn, M.P., Mr. Victor Blagden, Sir Max Bonn, Mr. J. F. Buxton, The Hon. Robert H. Brand, Mr. A. R. Chipperfield, Mr. H. B. Crole-Rees, Lord Dawson of Penn, Lord Devonport, Lord Feversham, Mr. B. A. Glanvill, Mr. W. Clarke Hall, Dr. Percy Hall-Smith, Mr. F. E. Hamer, Mr. E. Horace Holme, Mr. C. H. St.J. Hornby, Mr. H. G. Howitt, Mr. C. E. Hughes, Sir Edward Iliffe, Sir Robert Kindersley, Mr. C. Leveson Gower, Dr. Herbert Levinstein, Mr. C. Lidbury, Mr. F. A. B. Lord, Sir Percy Mackinnon, Mr. J. J. Mallon, Mr. Eric Miller, Colonel T. H. Minshall, Colonel J. H. Mitchell, Sir Ernest Moir, Sir Frank Newnes, Sir William Noble, Mr. A. R. Pain, Mr. W. Paterson, Mr. G. Pinckard, Mr. N. D. Power, Mr. Gordon Robbins, Sir Henry Rothband, Sir Walter Runciman, Mr. H. Gordon Selfridge, The Mayor of Stepney, Mr. M. C. Spencer, Mr. E. E. Starke, Mr. Edwin Strong, Mr. C. Gibson Tosswill, Mr. A. Townshend, Sir Gilbert Vyle, The Rt. Hon. Sir J. Tudor Walters, Mr. Sydney Walton, Lord Waring, Mr. Fred Welsford, Mr. Stanley Wharton, Sir Alfred Yarrow.

A HOSTEL GROUP: MISS LINDSAY, THE PRINCE, "PUCK," SIR ERNEST BENN, MR. J. J. MALLON, MR. F. E. HAMER, AND THE EARL OF FEVERSHAM.

When all were seated the first course was brought in by a party of Toc H volunteers reinforced by Messrs. John, Glanvill, and Christopher Benn and Mr. Keon Hughes. Mr. John Benn handed the Prince his plate of roast lamb and he helped himself to "spuds and green veg." After this course a waiter in chef's costume bore into the room a huge plum pudding and deposited it in front of His Royal Highness. The Prince carved it into generous slices and distributed them to a long succession of boys who filed to the table in front of him, contriving that the smaller boys should have the larger helpings. The carving was accompanied by the singing from alternate ends of the room of the special Hostel song, a piece of irresistible nonsense relating to a bucket with a hole in it. The Prince next helped the Mayor of Stepney on his left and Sir Ernest on his right to pudding and white sauce, and having done the same for himself showed that a good plum pudding, which this certainly was, is one of the links that bind the British race together. After this there was coffee and the company, deprived of the company of the Hostel boys, settled down to hear the speeches.

Sir Ernest Benn's Address

Sir Ernest Benn said:—I have received gracious permission to avoid all formality, and it would be a crime on my part to mar the whole spirit of this simple supper by giving it anything of the character of a speech-making function. But it is due to His Royal Highness and to you that as President I should say a word or two on this wonderful evening, far more wonderful to those of us who are intimately mixed up with this Hostel than any words of ours can express.

Our present position can be explained to a company like this in a very few sentences. We have spent on this freehold property and its equipment in all a matter of £24,000. The first £10,000 was provided by the Carnegie Trustees as a loan on mortgage without interest. £5,000 or £6,000 was borrowed from the bank and others, and has mostly been repaid, and that sum and the balance, making together £14,000, has been stolen, scrounged, extracted and otherwise picked up by methods which some of you have more reason to remember than have I, the persistent and pressing instrument who has merely to thank you for it. We spend here about £7,000 a year, and of this sum rather more than a third is provided by the boys themselves. Every boy in the Hostel pays us according to his means as much as he would normally pay if he had normal parents and a normal home. There is, therefore, from the boys' point of view, nothing in the nature of charity about the John Benn Hostel, a very important matter to remember. We have developed, since the Prince started us four years ago, an income, donation and subscription, upon which we can more or less rely, of about £3,000 and the balance of our income depends upon an annual banquet, fêtes and other devices. We are very near to smooth water in this voyage of discovery, for that is the real nature of our work. That smooth water will be reached through the wisdom and experience and generosity of the Carnegie Trustees who have from their wealth of knowledge of these matters given us what is in effect a most remarkable testimonial to our work. They are prepared to tear up their mortgage, to give us our freehold unfettered as soon as we can show them an investment account amounting to £10,000. That is then our immediate objective. You will see that £10,000 invested would bring our deficit down to manageable proportions, and bring us within sight of its disappearance as our subscription list grows from day to day.

The Making of Good Citizens

I decline altogether to regard the John Benn Hostel and the provision that we have made for seventy or eighty boys as the limit of our function or the possible extent of our work. We could not have allowed the Prince to bestow upon us so much of his wonderful encouragement for so small a purpose. This is a great practical experiment in the making of good citizens. We take the material which, if left to itself, would, indeed must, provide the future with trouble and discontent, if not with active social disruption, and we turn out first-class British citizens. But, day by day, Townshend, our Warden, turns away heaps of this material. The youngsters with whom you have supped represent no more than 10 per cent. of the same sort of youngsters for whom the same sort of provision might be provided at this very moment in the East End of London alone. The argument is as simple and as irresistible as any argument can be. Give a boy a good home and you get a good man. I therefore hope that you who have had the privilege of participating in this historic supper will feel that you have become trustees of a great new movement which must be got going. John Benn was a great London citizen, but there are fifty great London citizens round this supper table to-night, and it is at least a proper suggestion for me to make that many of them might put a seal to a fine record of public work in the form of an institution of this kind bearing their name. You have in the East End Hostels Association all the machinery for doing this sort of thing, but for the moment I merely leave the idea with you.

That brings me to my third and last remark. Every good work in this old country has one common ambition. It is to get a nod of recognition from the one man who is the supreme judge and master of the good works of his time. He cannot do one hundredth part of the things that he would like to do, or one thousandth part of the things that other people would like him to do, and yet it has been my privilege, as the nominal head of the East End Hostels Association, on behalf of all my colleagues and all the good folk who work in this show, on three separate occasions to have the high honour of receiving him here, and to-night to stand beside him while he got right down to the practical end of the business and put his royal hand to the kitchen work of the institution. I do not presume to embellish that simple story with a single adjective or to spoil it with any attempt at rhetoric. I merely tell it to you and leave you to imagine what it means to us.

The Earl of Feversham said there had been two men who had set the East End Hostels Association going. The first was the Prince, who came to open the John Benn Hostel four years ago. The second man was Sir Ernest Benn, who had put his whole heart and soul and energy into the welfare of the seventy-five boys for whom the Hostel provided accommodation. They called themselves the East End Hostels Association, but they had at the moment only one Hostel. He hoped that within two years they would see in that part of London about two other hostels on the same lines.

The Prince's Reply

The PRINCE OF WALES said: When I came to open the Hostel in 1927 I made the remark that if we did not think a ship was a good ship we would not give her a launching ceremony, and if the merits of the scheme we launched that day were not obvious no amount of talking that we could do would convince people. The same holds good all the more to-day, when all the hopes that I expressed at that opening ceremony have been more than fulfilled. Most of you gentlemen who have been invited to this show to-night knew before you accepted that it was a good show. From what we have seen, what we have heard, and what we know about the Hostel, I am sure you are convinced that it is run on very sound lines. It is a great work, a grand work, turning out from amongst a very large population, which does not otherwise get the opportunity, the right type of citizen. One of the great points of this scheme is the fact that these boys—and all of them are destitute when they come in here—have to pay whatever they can, and that is just the whole difference that makes it so much of a club to which they subscribe and gets away from that old hackneyed word "charity." I know that is the right thing. I am delighted to come here to-night and show my sympathy with the splendid work that is going on here, and I sincerely hope that other branches of the East End Hostels Association, which has become firmly consolidated during the four years of its existence, will grow and that this great and splendid work will spread. Your President has invited you here to-night and, I know, has some very good friends of the Hostel. I am sure that to-night's events have made still more friends. It is a very attractive atmosphere; all that work of the play rooms, apart from the boys that reside here, is a wonderful opportunity for the children as well. I can assure you, Mr. President, that it is a very great pleasure to me to come here to-night, and I cannot say more than that I shall always be ready to help and encourage you in the splendid scheme you have in this important part of this great city. (Loud applause.)

The Mayor of Stepney expressed his appreciation of the Prince's visit to the borough and his interest in the Hostel work, which, he said, was a splendid work and second to none of its kind.

The last hour of the evening was spent in the spacious gymnasium on the top floor, where Lady Benn had already assembled a large party and received the supper guests after the meal. The Prince watched with keen interest a boxing display by boys trained during the past year by Mr. Glanvill Benn, and handed silver medals to the four sports champions of the "houses" into which this Hostel is organised. The pre-arranged moment for his departure had already passed, but after the presentation of the medals he insisted on staying for a performance by the boys' minstrel troupe.

Amongst those who accepted invitations to the reception were: Lt.-Col. J. H. Alexander, Mrs. John Benn, Mrs. Wedgwood Benn, Mr. and Mrs. J. M. Blanch, Mrs. Robert Brand, Sir Edward Brown, The Hon. Victoria Bruce, Dr. and Mrs. J. M. Bulloch, Mr. and Mrs. Alfred Butes, Mr. and Mrs. M. C. Carr-Gomm, Elizabeth Lady Cheylesmore, Mrs. W. Clarke-Hall, Mr. and Mrs. A. Crawford, Lady Dawson of Penn, The Hon. Richard and Mrs. de Grey, Sir James and Lady Dundas-Grant, Lady Emmott, Mr. and Mrs. Gilbert Foyle, Lt.-Gen. Sir William and Lady Furse, Mrs. B. A. Glanvill, Wing Commdr. and Mrs. Louis Greig, Gen. Sir Ian and Lady Hamilton, Lady Hankey, Sir Edgar and Lady Harper, Mr. and Mrs. J. H. Harris, Colonel and Mrs. Harrison, Major Newland Hillas, Sir Archibald and Lady Hurd, Lady Iliffe, Lord and Lady Jessel, Sir Roderick and Lady Jones, Sir Daniel and Lady Keymer, Lady Kindersley, Mr. R. H. G. Leveson-Gower, Mrs. Levinstein, Lt.-Col. Sir Cecil and Lady Levita, Mrs. C. Lidbury, Mrs. F. A. B. Lord, Lady Mackinnon, Sir Lynden and Lady Macassey, Sir Donald and Lady Maclean, Sir Bernard and the Hon. Lady Mallet, Sir George and Lady Marjoribanks, Sir Ernest and Lady Meinertzhagen, Sir Dawson and Lady Miller, Lady Moir, Mr. and Mrs. F. St. John Morrow, Lady Newnes, Lt.-Col. Sir Frederick O'Connor, The Hon. Mrs. Geoffrey Pearson, Mr. and Mrs. F. Handley Page, Mrs. W. Paterson, Mrs. George Pinckard, Mr. and Mrs. Bernard Rackham, Mr. C. D. Ross, Lady Rothband, Mr. and Mrs. D. G. Ryder, Colonel S. E. St. Leger, The Mayoress of Stepney, Mrs. M. C. Spencer, Mrs. Edwin Strong, Colonel and Mrs. C. Thackeray, Major and Mrs. F. W. J. Thomas, Lt.-Col. and Mrs. Thunder, Mr. and Mrs. Geoffrey Vickers, Lady Walters, Mrs. Sydney Walton, Mr. and Mrs. G. Godfrey Warr, The Rev. and Mrs. Dudley Whitwham, Mr. and Mrs. Valentine Williams, Sir Walter and Lady Willson.

Colours for Ready Mixed Paints

British Standard Schedule

BUILDERS, decorators, painters, and the ordinary householder will welcome the publication, by the British Engineering Standards Association, of a British Standard Schedule of Colours for Ready Mixed Paints. This schedule was prepared by a sub-committee of experts of the regular Technical Committee on Paints and Varnishes, which, early in its work, became convinced of the desirability of such a publication.

The examination of a very large number of colour cards showed that there were nearly 3,000 different colours on the colour cards issued by manufacturers and suppliers of ready mixed paints alone and many hundreds of different shades of some of the colours. In addition there were many names for the same colours. The work of the Committee was threefold: —(*a*) To select a reasonable number of popular colours for standardisation; (*b*) to find an agreed name for each colour: (*c*) to include a colorimetric analysis by some agreed method.

The schedule contains 57 colour patterns with agreed colour names and in every case the endeavour has been to make these names self-explanatory to the ordinary user and to avoid technical terms. Appendices give the colorimetric value of each colour, measured at the National Physical Laboratory on the Guild Colorimeter and a specification of the celluloid used to mount the colours. The best available knowledge in regard to the permanence of the colour samples has been available to the committee and experiments are being made in various parts of the world to test, under the most severe climatic conditions, the permanence of the actual colour samples included in the publication. Future editions, however, will have colours which agree with the colour analysis and will therefore be exact reproductions of those now issued, so that even if absolute permanence has not yet been achieved in the production of all the standard samples, this will not interfere with the establishment of the standard of colour.

The Standards Association is making arrangements to have colour measurements made periodically, and a new edition will be published if and when necessary. Copies of the schedule, B.S.S. No. 381–1930, may be obtained from the Publications Department, British Engineering Standards Association, 28, Victoria Street, London, S.W.1, price 7s. 10d., post free

The Late Dr. Ellwood Hendrick

MANY of our readers will regret to hear of the death of Dr. Ellwood Hendrick, of New York, and will be reminded of his striking personality by the "snap" we reproduce—a very happy and characteristic one taken by Mr. John Benn during the annual meeting of the Society of Chemical Industry in Leeds, in July, 1925.

Dr. Hendrick was universally known among American chemists for his great interest in science, as a first-rate club man who seemed to be at every gathering of note, and a most agreeable and cultivated companion. He was of Dutch origin and had many of the national characteristics. Fond of travel and able to indulge his tastes, he travelled widely and annually visited this country and the Continent, being present at the last annual meeting of the Society in Birmingham. He was very fond of good company and fell into it most naturally. He was an entertaining conversationalist and raconteur, his wide reading and travel and his love of literature and art making him a welcome guest everywhere. But it was his natural largeness of heart and character, his honest kindness and courtesy, that his friends will most remember.

He loved England and all that England means, and had indeed more than once hinted at his desire to settle here. But his roots were really in New York, where he was widely known and much beloved and where he will be greatly missed by his fellow members of the Chemists' Club and a host of other friends. He was for many years attached to the editorial staff of *Chemical and Metallurgical Engineering* during Dr. H. C. Parmelee's editorship.

An Appreciation

Mr. John A. Benn (who knew Dr. Hendrick well) writes:—

By the death of Dr. Ellwood Hendrick, this country loses a stalwart friend. Behind his immediate interest in chemistry, which made him a familiar figure in English chemical circles, was a profound admiration for England and a real desire to interpret our ideas to a wide circle of friends in his own country. I first met Dr. Hendrick shortly after spending a year as a student at Princeton University, and a mutual interest was at once established. His enthusiasm for education was boundless, and the views he expressed on comparative conditions in England and America clearly showed his wide acquaintance with the subject.

During the last few years he was connected with the Library of Columbia University and he frequently introduced American writers to our publications, showing a keen concern for scientific progress generally. As illustrating the range of his interests, it may be mentioned that bird migration was one of the problems he discussed with me during his visit to London last summer. On the same occasion he asked to review an American book on "Liberty," which dealt with matters of international importance.

Dr. Hendrick's wide knowledge was rooted in a profound concern for the finer things of life and for the value of individual effort, which he believed were in danger of being submerged under modern conditions. His views on this important problem were summarised in one short passage, which perhaps represented a final message to his friends in both countries. "The tyrant," he wrote, "does not sit with crown and sceptre upon his throne in civilised countries any more. He is with us, nevertheless, as cruel and vindictive as ever, in the voice of the mob. There abides the greatest danger to our cherished freedom and liberty, not only in America but throughout the civilised world."

Industrial Aspects of Bromine and Its Compounds—(II)

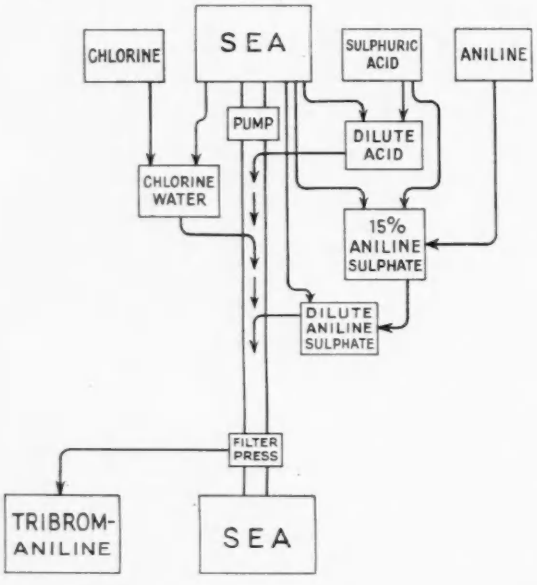
By G. Malcolm Dyson, Ph.D., A.I.C.

The sources, manufacturing processes and industrial uses of bromine and its compounds are reviewed by Dr. Dyson in the following article, of which the first instalment appeared in our issue last week. The second and concluding part is given below.

THE process for the working up of bromine depends on the conversion of the bromine ion to elementary bromine by chlorine, and the precipitation of the bromine as tribromaniline. In any plant situated on shore the costs of pumping the prodigious quantities of sea water either from the sea or back again after treatment are prohibitive, and in addition the suspended matter near shore stations interferes very considerably with the filtration plant. These factors made it necessary to take the factory to sea on board the ss. "Ethyl," which was a cargo boat specially reconstructed to carry out the experimental production of bromine. The flow sheet below indicates the general run of the plant. The ocean line conducted the water to the plant at a rate of about 5,000 gallons per minute. The water was mixed with sulphuric acid in the proportion of about 200-300 parts per million. The presence of sulphuric acid is vital to the success of the operations, for the following reasons. The decomposition of the bromide is done with very dilute chlorine water, which at the dilution used is nearly all present in the form of hypochlorous acid, which, instead of liberating the bromine, just oxidises the aniline, with the formation of coloured by-products; in the presence of a small amount of sulphuric acid the formation of the hypochlorous acid is depressed and the reaction follows the equation :—

$$3.Br.^- + 3.Cl_2 + {}^-C_6H_5.NH_2 = C_6H_2.Br_3.NH_2 + 3.H^+ + 6.Cl^-$$

The chlorine is added in the form of very dilute chlorine water, and is prepared by allowing the gas to bubble at a fixed rate through slightly pre-heated water, which is then mixed with the sea water. The pre-heating was necessary to avoid the formation of chlorine hydrate, which interfered with the



exact adjustment of the chlorine feed. It is necessary throughout the whole process to adjust the rates at which the various chemicals are added to the sea-water with considerable care, as an excess of chlorine leads to oxidation of the aniline. The water after each admixture was passed through an injector and turbulence chamber, in order to effect an almost instantaneous mixing of the various reactants.

The three chemicals used are sulphuric acid of S.G. 1·84, liquid chlorine and aniline sulphate. The supply was drawn from the bulk storage tanks to smaller intermediate storage tanks, in the case of sulphuric acid, and fed through a constant-head float-controlled feed box into a pump delivering to a mixer, which reduced the strength of the acid to 1 per cent. This diluted acid was then fed to the turbulence chamber and injector of the main sea-water feed line, and supplied at such a rate that the final amount of acid approximated to 200 parts per million. This acidulation was complete in three seconds. The liquid chlorine was stored in 1-ton containers (liquid chlorine weighs 90 lbs./cu. ft.), and fed into a chlorinator such as that used for the treatment of water for sanitary purposes; the actual chlorinator was of the Wallace and Tiernan type. The water leaving the chlorinator was found to contain about 0·5 per cent. of chlorine, and was conveyed to a storage tank by means of rubber-lined armoured hose. The addition of the chlorine water to the feed main carrying the acidified water was made through an injector and turbulence chamber similar to that already described for the addition of acid. The admixture was completed in three seconds, when the main line water contained 64 parts of chlorine per million. This figure is calculated on the assumption that the water contains 60 parts of bromine per million, although in actual fact it contained rather more than this; excess of chlorine is to be avoided. The equilibrium between the bromine and chlorine ions and atoms is rapidly reached, and the only chemical process remaining is the formation of tribromaniline. The aniline was blown into sulphuric acid and seawater in such proportions that a stock solution of aniline sulphate containing 15 per cent. was formed. This solution in turn was mixed with more water, and then with the sea water to be treated. The formation of the tribromaniline is almost instantaneous, and the compound separated in the crystalline form, minute crystals in needle shape being produced 0·001 in. long and about one-tenth of this in thickness. The separation of the tribromaniline was effected by means of recessed-type, wood-plate, Schriver filter presses, dressed with XX chain filter duck. The operating pressure was 30-35 lbs./sq. in.

The following figures have been given by the inventors for the process :—

Rate of water flow	4,750 gallons/minute
Bromine content	67·7 parts/1,000,000
Duration of run	3 hours
Weight of crude dry tribromaniline	492 lbs.
ANALYSIS OF CRUDE PRODUCT—	
Tribromaniline	81·52 per cent.
Bromine content	59·26 per cent.
Ash—ferric oxide	2·83 per cent.
Undetermined matter	15·65 per cent.
Yield of bromine per day	490 lbs.
Percentage yield	60 per cent.

It will readily be seen from this description of the process that the direct recovery of bromine from sea water is a feasible proposition, and that we need at no time fear the exhaustion of our sources of this element. The material costs for the production of bromine in this way amounted to just under 9d. per pound, and at the time of the experimental cruise the market quotation for bromine was 23d. per pound. The labour, administration and overheads are not to be assessed, since the cruise was experimental, and it is a matter of considerable interest to know what margin the commercial exploitation of this process would allow.

Production, Properties and Prices

The production of bromine was at one time almost confined to the U.S.A. and Germany, although of recent years France, Italy and Russia have become self-supporting in so far as bromine is concerned. The chemical price war which raged between the two major producers in the period 1904-1908 led to the cutting of prices down to 5d. and 5½d., for bulk lots, and this price led to the closing down of all U.S. bromine plants, with the exception of that operated by the Dow Chemical Co., who were able to undersell the German product. A price agreement between the producers of the two countries increased the price to 11d. per pound, at which point it remained level for the years preceding the war. Prior to the war

the annual world production of bromine was 1,100 tons. Since the war the price has had a somewhat adventurous career. In 1922 it was quoted by the Deutsche Bromkonvention Gesellschaft at 3¾d. per pound, but rose rapidly, until in September, 1927, the price was 1s. 6d. per pound, although there was no commensurate rise in the price of foreign bromides; the high price of bromine was, apparently, maintained to discourage the manufacture of bromides in countries other than those producing the bromine; it is not likely that the present f.o.b. cost of bromine in Germany is over 6d. per pound. There are three grades of bromine obtainable: the crude, containing between 2 and 5 per cent. of chlorine; the refined, containing about 0·3 per cent.; and the C.P. grade, which is free from all but mere traces of impurities. The actual impurities are bromoform, and chlorine, and purification treatment consists in washing with concentrated sulphuric acid to remove the former, and redistillation over solid sodium bromide to effect removal of the latter.

Uses of Bromine

The main uses of bromine may be divided into two sections: the use of relatively small amounts in analytical procedure, and the use of bulk quantities for the synthesis of industrial products. It may be mentioned that bromcyanogen has been proposed as a method for the treatment of gold telluride ores, and has been proved successful in actual practice; it is prepared by the acidification of a mixture of the bromate, bromide and cyanide of sodium, and is therefore produced *in situ* as required. Bromoform is used in mineralogical analysis for the partition of minerals of different density. It has a density of 2·9. By far the largest amount of bromine is converted into bromides of various sorts and which have a wide use medicinally and for synthetic purposes, although an even larger amount has been used in recent times for incorporation into the "ethyl fluid" used for the treatment of petrol as an "antiknock." The "ethylising fluid" consists of a mixture of lead tetraethyl with ethylene bromide, the use of which has been referred to earlier. It is a point of interest that the demand for bromine which has arisen through the wide use of ethyl petrol may only be temporary. The large-scale production of iron carbonyl which achieves the same result as lead tetraethyl, gives indication of replacing the lead treatment.

Bromine is of exceptional use in analysis for the determination of various organic amines and hydroxy compounds which react easily with the element with the formation of sharply defined products. The method almost universally used is that of "excess titration," in which an excess of bromine over that required for complete conversion of the compound (to be estimated) into its bromo derivatives is added; and the bromine which remains is titrated by the addition of iodide and thiosulphate.

Important Analytical Method

The method described below is the technique of Day and Taggart, and has proved eminently satisfactory. The details are as follows. A quantity of the substance to be analysed is weighed out and dissolved in water. Dilute sodium hydroxide may be used for phenols and dilute hydrochloric acid for amines and similar compounds, and sufficient material is weighed out for ten analyses. This solution is diluted to 250 cc. The actual determination is made by pipetting out 25 cc. into the iodine flask (as shown), followed by 25 cc. of N/5 bromine solution, washed in by 50 cc. of water. Five cc. of concentrated hydrochloric acid are added and the flask immediately stoppered, shaken for one minute, and allowed to stand for a period which depends on the nature of the substance for analysis. The so-called bromine solution is a stable solution of 75 gm. of potassium bromide and 5·6 gm. of potassium bromate dissolved in one litre of water.

The still-stoppered flask is cooled under the tap and 5 cc. of a 40 per cent. solution of potassium iodide placed in the funnel-neck. On loosening the stopper the iodide solution is drawn into the flask without the loss of any bromine vapour. When decomposition is complete the stopper and neck are washed with distilled water and the combined mixture titrated with N/10 thiosulphate solution. The results given by this method are given in the following table, which is taken from Day and Taggart's original paper, *Ind. Eng. Chem.* **20**, 547 (1928):—

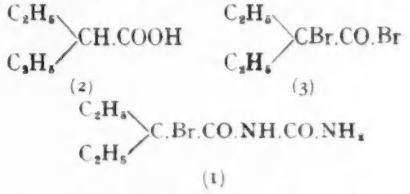
Substance.	Sample Gm.	Solvent.	Dilution cc. H_2O	Bromination Preiod.	Br Equiv.	Result. %
Phenol	0·5–0·6	NaOH	50	5–30	3 Br_2	99·89
p-Chlorphenol	0·5–0·7	NaOH	100	30	2 Br_2	99·87
o-Nitrophenol	0·5–0·7	NaOH	50	30	2 Br_2	99·77
m-Nitrophenol	0·5–0·6	NaOH	50	5–30	2 Br_2	99·88
p-Nitrophenol	0·7–0·9	NaOH	50	5–30	2 Br_2	99·90
2:4-Dinitrophenol	1·5–1·8	NaOH	50	30	1 Br_2	99·92
Salicylic acid	0·5–0·6	NaOH	50	30	3 Br_2	99·86
3-Hydroxybenzoic acid	0·5–0·6	NaOH	50	15	3 Br_2	99·85
Methylsalicylate	0·6	NaOH	50	30	3 Br_2	99·82
Phenylsalicylate	0·4–0·5	NaOH	50	30	6 Br_2	99·87
Acetylsalicylic Acid	0·6–0·7	NaOH	50	30	3 Br_2	99·84
m-Cresol	0·5–0·6	NaOH	50	1	3 Br_2	99·75
Resorcinol	0·5–0·5	Water	100	1	3 Br_2	99·95
β-Naphthol	1·2–1·5	NaOH	0	15–20	1 Br_2	99·89
Thymol	0·4–0·8	NaOH	0	15–20	2 Br_2	99·77
Aniline	0·5–0·6	HCl	50	5–10	3 Br_2	99·92
p-Chloroaniline	0·9–1·2	HCl	50	10	2 Br_2	99·93
o-Nitroaniline	0·5–0·6	HCl	100	30	2 Br_2	99·86
m-Nitroaniline	0·5–0·6	HCl	50	30	3 Br_2	99·89
Acetanilide	0·5–0·7	HCl	50	5–10	3 Br_2	99·84
Sulphanilic acid	0·5–0·6	NaOH	50	30	3 Br_2	99·98
Metanilic acid	0·5–0·6	NaOH	50	5–15	3 Br_2	99·80
Anthranilic acid	0·5–0·6	NaOH	50	30	3 Br_2	99·89
m-Aminobenzoic	0·5–0·6	NaOH	50	10–15	3 Br_2	99·86
m-Toluidine	0·5–0·6	HCl	50	5–10	3 Br_2	99·87

The general excellence of these results makes this method of paramount importance in industrial analysis. It must be pointed out that the titration of β-naphthol or thymol by this method requires the addition of 5 cc. of chloroform to ensure solution. Results which are lower than the theoretical are invariably obtained with *p*-nitroaniline.

Bromine Compounds of Commerce

The alkali bromides form the greater bulk of the bromine compounds of commerce and may be considered to account for about two-thirds of the bromine produced. The fact that the element bromine is the raw material for the production of bromides leads to the necessity for a roundabout method for the production of the pure alkali bromides. The interaction of caustic alkalies with bromine gives hypobromites, together with a certain amount of the bromide and bromate and is quite unsuited for the large-scale production of the bromide. The method used is similar to that employed for the production of the alkali iodides, namely through the ferrous salt. If bromine is allowed to trickle slowly into a mixture of iron borings and water the ferrous bromide is readily formed, and alternate charges of iron and bromine may be added to the mixture until a very heavy syrup of ferrous bromide is formed. This is siphoned off from sediment and treated with the theoretical amount of alkali carbonate at the boil and the solution filtered from the basic iron precipitate, evaporated and crystallised.

The alkali bromides are usually considered the most safe sedative that medicine has at its disposal, and are very widely used. In the synthesis of more potent narcotics the organic bromine derivatives have been considerably drawn upon, and a short account of the bromine narcotics is appended. Adalin, bromdiethylacetylurea (1) is one of the most widely used. The raw material for its production is diethylacetic-acid (2) obtained in the usual way from malonic ester



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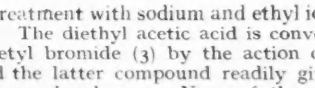
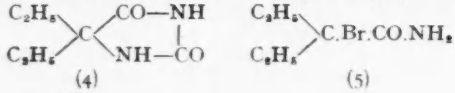


(1)

by successive treatment with sodium and ethyl iodide followed by hydrolysis. The diethyl acetic acid is converted into the bromdiethylacetyl bromide (3) by the action of phosphorus tribromide and the latter compound readily gives adalin on warming with powdered urea. None of the processes calls for any special comment, save the final operation—the condensation of the brom-acid bromide with urea. The former compound (258 parts) is added to the powdered urea (122 parts) and the mixture allowed to remain at room temperature for twelve hours, stirring being maintained during this period. The reaction is finished off by heating on the water-bath to 60–70° C. for several hours. The cold reaction product is treated with water, and sodium hydrogen carbonate added until a faint alkaline reaction is obtained. The undissolved material is the required urea and is washed, and recrystallised

from an anhydrous solvent, since it readily loses hydrobromic acid with the formation of the corresponding hydantoin (4).



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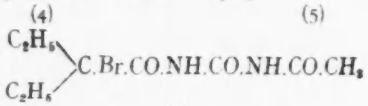
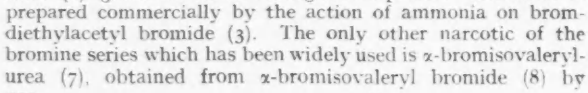


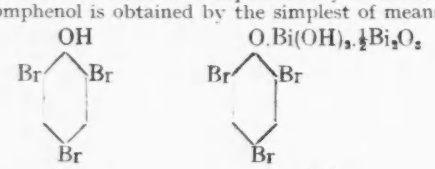
(6)

It appears that the bromination of acid amides and ureas almost invariably enhances their physiological activity. Thus, bromdiethylacetamide (commercially known as "Neuronal") (5) is possessed of a stronger narcotic action than diethylacetamide, and adalin is stronger in its activity than the unbrominated compound. It is of interest to note that the acetylation of adalin, to give the acetylbromdiethylacetyl urea (6) gives an even stronger compound. Neuronal is prepared commercially by the action of ammonia on bromdiethylacetyl bromide (3). The only other narcotic of the bromine series which has been widely used is α-bromisovaleryl-urea (7), obtained from α-bromisovaleryl bromide (8) by



(7) (8)

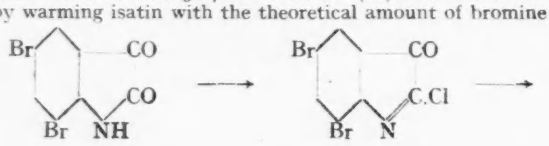
a process analogous to that used in the preparation of adalin. The antiseptic action of bromine and its compounds is, as a general rule, parallel to that of the corresponding compounds of chlorine, although the latter find a wider and more extensive commercial application. Among the bromine compounds more regularly used as antiseptics, the symmetrical tribromphenol and its basic bismuth compound may be mentioned. The tribromphenol is obtained by the simplest of means, the



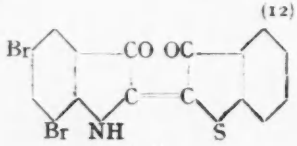
(9) (10)

bromine being allowed to drop into cooled and stirred phenol. After the addition of the theoretical amount of bromine the product is crushed and washed with water until all traces of acid have been removed, after which it is recrystallised from dilute alcohol. It is mainly used in the form of its basic bismuth derivative (Xeroform) obtained by the addition of normal bismuth nitrate to a solution of tribromphenol in caustic soda. Xeroform is a yellowish powder, insoluble in water, and is used as a dust dressing for wounds.

In dyestuffs technology there are very few applications of organic bromine compounds, and except in the production of certain of the semi-indigo vat dyes they are seldom met with, being replaced, as a rule, by the cheaper analogous chlorine compounds. The principal intermediate used in dyestuffs manufacture is the 5 : 7-dibromisatin (11) which is obtained by warming isatin with the theoretical amount of bromine in



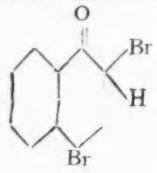
(11) (12)



(13)

concentrated sulphuric acid solution, the product being isolated by pouring into water. It forms a chloride (12) on treatment with phosphorus pentachloride which will condense with intermediates of the thioindigo class to form vat dyes of the type shown in (13).

The naphthalene indigos are also prepared by the use of bromine compounds. Thus, when 2 : 4-dibrom-α-naphthol is heated with alkali in pyridine solution a deep blue product is obtained which has the



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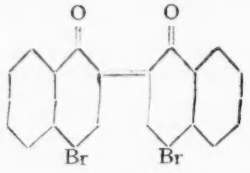


(15)

appearance of indigo. The constitution (15) has been assigned to the compound, and its formation seems to take place by the elimination of hydrobromic acid. The structure of this dye is interesting in that it throws a light on the structure of indigo as a bi-nuclear quinone.

Electrophoresis in Biochemistry

Lecture to Manchester University Chemical Society

A LECTURE entitled "Electrophoresis and Some Biochemical Applications" was given before the Manchester University Chemical Society, by Dr. E. B. R. Prideaux, on Tuesday, November 4. Electrophoresis, said the speaker, may be defined as the motion of microscopic and colloidal particles in an electric field. This motion is observed either microscopically, by magnification of a few individual particles, or as the motion of a boundary in some form of U tube (macroscopic method). The U tube method was applied by Linder and Picton and Burton to determine the velocity and charge of suspensions including metal sols, which are generally negative in water; and to serum proteins by Hardy, who showed that they might move as if positively or negatively charged according to the conditions.

The most important condition to be determined is the pH. Protein migrations have been investigated in buffered solutions, beginning with the work of Loeb. The evolution of apparatus, and the methods for making protein boundaries visible, were described with some details as to experiments which have been published from Nottingham University College. The results show characteristic differences between egg albumen, gelatine and casein. A positively or negatively charged protein may move with a velocity about one-third as great as that of a sodium ion.

The motion of blood corpuscles, erythrocytes and leucocytes, in buffered serum solutions has been studied by Freundlich and Abramson. The motion of the red corpuscles is characteristic of each animal species; those of the rabbit being the slowest and those of the dog the quickest. The white corpuscles move with a lower velocity than the red, in the same electric field.

It is considered that electrophoresis may furnish an explanation of the migration of white corpuscles to damaged or infected parts of the animal body, setting up the inflammatory process.

Anglo-Soviet Trade Figures

IN a statement on Anglo-Soviet trade during 1929–30, the first year (ended September 30) of the renewal of normal trading relations between the two countries, M. Bron, chairman of the U.S.S.R. trade delegation in Great Britain, says that the total amount of purchases made by Soviet trading organisations in Great Britain during the year reached £15,395,000, against £9,921,433 in the previous year. This amount does not include general agreements under which orders have to be placed up to certain amounts and during certain periods. These, signed for the first time, represent £5,000,000. Soviet sales in Great Britain amounted to £23,542,322, against £29,339,584. The number of English ships chartered for the needs of Soviet grain, timber, naphtha, and miscellaneous exports reached 418, against 76.

Purchasers of chemicals, machinery, fertilisers, tools, iron and steel, ships, and other goods produced and manufactured in the United Kingdom and Northern Ireland more than doubled. It is pointed out that against the present total of Soviet sales of £23,542,322, the average yearly imports from Russia into Great Britain during the years 1909–13 amounted to £40,012,000, calculated in pre-war prices.

Research in the Paint and Varnish Industry

Address by Dr. L. A. Jordan

An address on the work of the Research Association of British Paint, Colour and Varnish Manufacturers was given by Dr. L. A. Jordan, the Research Director, before a large meeting of representatives of London firms and of members of the Oil and Colour Chemists Association in London on Tuesday, November 4.

MR. H. J. JONES, chairman of the London Paint, Colour and Varnish Association, who presided, said that as an industry, they had always prided themselves on the excellence of British products. In general their pride was justified but their export trade has been steadily going down. Perhaps it was that among the different nationalities competing for trade, say, in South America, no bad material was offered though some might be better than others. In that case the question as to who got the business was determined by other factors and price was one such factor; butequally important to the discriminating buyer was the knowledge and technical science behind the organisation.

Achievements in Three and a Half Years

In the course of his address Dr. Jordan pointed out that the active life of the Research Association up to the present was three and a half years, but in that time not only had a great deal of work been done, but it had also been found how best to apply the activities of the Research Association for the benefit of the membership. As a concrete achievement he mentioned the foundation of a specialist library which was worthy of any industry and which was badly wanted. The fact that the Carnegie United Kingdom Trustees had thought fit to make a substantial grant to the Association for library purposes was the best tribute it was possible to pay. Then there was the bi-monthly review of current literature, which was generally admitted to be a very excellent production of its class. It was significant that of the few firms in the country who were not members of the Association, some had asked to be allowed to have the Review, and that when this request could not be conceded, they borrowed it indirectly. There was a great variety and volume of inquiry work of all descriptions, and up to the present nearly 1,200 inquiries had been received on one subject or another. In some 80 per cent. of these cases the Association had been able to render considerable assistance.

In regard to the fundamental investigation work, twenty technical papers had been issued, but they conveyed nothing of the real scope and possibilities of the Association, for behind the twenty papers there was already a prospect of at least forty more, and in spite of the wide field of work there were very few subjects upon which someone at the Research Station could not contribute something useful. At the same time the mere issuing of technical papers was not everything, because, limitations of human understanding and powers of expression being what they were, some effort was required to turn the results described into useful material.

Research by Individual Firms

The work of the Association was complementary to the research departments of individual firms, but the development of the one benefited the other. It was now the general experience of the larger firms with research establishments of their own that the effectiveness of their staffs was enhanced by contact with the Association. The appeal to smaller firms with little or no scientific staff took a slightly different form, for the Association had to demonstrate and explain to its individual members the meaning and utility of the results obtained. Nevertheless, the utmost care was taken to render service to the smaller member according to his need. The Association was one of the principal vitalising forces of the industry, leading the way to a wider adoption of scientific control in technical operations, even when these operations were of great antiquity, for progress could be more efficiently secured by scientific methods than by the expensive process of trial and catastrophe on the large scale.

Dr. Jordan went on to present in detail results obtained from some of the research work in hand, particularly work on linseed oil, tung oil, new synthetic resins, the functions of thinners, exposure tests, natural and accelerated weathering work, hiding power of pigments, wetting of pigments, the functions of driers, specking of varnishes, the meaning and measurement of gloss, various matters arising out of the colour changes and decomposition of lead chromes and the more recent work on colour measurement and colour fading.

On the subject of the fading of chrome printing inks, Dr. Jordan demonstrated by experiment circumstances under which, in the course of a few minutes, chrome inks could be completed bleached. This matter was of great commercial consequence, because it was now established beyond any shade of doubt whose was the responsibility for this kind of happening. In regard to the studies in linseed oil Dr. Jordan dealt with the general principles of heat-treatment processes and explained work recently carried out on the differences between oils of varied origin and upon the specific and varied uses for oils which had been subjected to different treatments, and he showed the commercial value of this work not only in connection with livering problems but also with new products, as in the case of the recent developments in the use of sulphurised oils with which it was possible to produce durable, elastic and rapid drying coatings from any number of coats applied, one after the other. Fundamentally the object was to produce a material which would gelate rapidly, and that the gel so produced should be in a condition of minimum susceptibility to swelling at the time of the application of the subsequent coat. The condition was very akin to that needed, for example, by petrol-resisting paints which possessed their resistance through not swelling in the solvent. As there was no swelling, there was no tendency for the film to disintegrate. The result was that it is possible to obtain a series of coats of jelly which sets as a whole.

Wrinkling of Films

The problem of wrinkling of films was one upon which many distinguished people had written at different times, without taking the matter very far. At the Research Station they had come to the conclusion that wrinkling was always the outcome of discontinuity of and in the film system, and the application of these wet films one after the other was a striking confirmation of this point of view. There were two methods of achieving this gelated condition, one of which was to attain a high concentration of disperse phase in the oil base, a condition that could be obtained by the use of sulphur-treated oils. The second method consisted of giving the oil base a structure by the introduction of a material itself capable of showing micellulor structure in the oil. The patent procedure took the form of treating an oil of high acid value with a suitable base, magnesia being named.

The subjects of emulsions and water paint, and of accelerated weathering work were illustrated by a series of lantern slides and Dr. Jordan indicated the means used to obtain results corresponding to natural exposure. On time factor relationship between artificial weathering and natural exposure, Dr. Jordan said that, speaking very broadly, one 24 hour day of the scale recommended was equivalent to about three weeks of average natural exposure. Average natural exposure meant very little and consequently there might be considerable variation on this figure according to the age of the film at the beginning of the exposure, the season of the year, the location of the station and the kind of product being tested. He recommended that the best way of estimating the life of a product was to take the average hours of the life of the coatings, and he mentioned the kind of values which would be expected from the usual series of standard products.

As the result of the work of the Association on colour measurement and colour fading during the last two years it was now possible to determine the colour fading propensity of pigments and to provide a standard procedure for specifying fastness to light without reference to the properties of other pigments. The Council of the Research Association had already determined that every possible help should be given to ensure the utilisation by the industry of the methods propounded in this work, which was of international standing. Thereby the British colour maker had an excellent opportunity of pointing the way to a new level of quality and satisfaction in the use of colour.

British Chemical Overseas Trade for October

Further Decline in Exports and Imports

THE Board of Trade returns of British overseas trade for October show a heavy decline in business in chemicals compared with the same month last year. Imports totalled £1,253,822, a decline of £582,407 on the figures for October, 1929, and exports at £1,941,454 have dropped £602,566. Re-exports at £63,615 are £12,813 down. Over the full ten months of this year there are declines of £2,433,527 in imports, and £2,609,345 in exports, compared with the corresponding period of 1929.

Imports

	Quantities Month ended October 31, 1929.	Quantities Month ended October 31, 1930.	Value Month ended October 31, 1929.	Value Month ended October 31, 1930.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acetic Anhydride ..cwt.	Tons 60		98,595	196
Acid Acetic .....tons	2,801	709		24,249
Acid Tartaric .....cwt.	2,424	3,181	16,835	15,099
Bleaching Materials ,,	10,707	6,322	11,243	10,339
Borax ..... ,,	12,011	25,285	6,509	15,070
Calcium Carbide .. ,,	93,547	89,578	57,476	54,519
Coal Tar Products value	—	—	5,703	109,602
Glycerine, Crude...cwt.	100	124	185	291
Glycerine, Distilled ,,	752	1,037	1,807	3,658
Red Lead and Orange Lead .....cwt.	3,743	3,680	5,884	5,597
Nickel Oxide ..... ,,	44	367	204	1,818
Potassium Nitrate (Saltpetre).....cwt.	8,888	7,426	8,946	7,377
Other Potassium Compounds .....cwt.	580,714	513,016	134,878	113,380
Sodium Nitrate ... ,,	25,778	68,873	13,130	34,642
Other Sodium Compounds .....cwt.	47,125	66,178	34,627	39,475
Tartar, Cream of... ,,	2,760	3,909	12,892	16,451
Zinc Oxide .....tons	1,138	731	34,044	21,044
All Other Sorts ...value	—	—	794,872	232,577
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	172,714	190,667	11,534	13,745
Bark Cinchona (Bark, Peruvian, etc.)...cwt.	3,546	2,062	15,916	8,504
Other Sorts .....value	—	—	225,870	169,228
DYES AND DYESTUFFS—				
Intermediate Coal Tar Products .....cwt.	109	50	1,875	539
Alizarine ..... ,,	170	79	3,592	1,708
Indigo, Synthetic . ,,	—	—	—	—
Other Sorts ..... ,,	3,845	3,303	74,348	76,500
EXTRACTS FOR DYEING—				
Cutch .....cwt.	3,847	1,520	6,695	2,665
All Other Sorts .... ,,	2,672	2,469	11,852	7,593
Indigo, Natural.... ,,	—	24	—	672
Extracts for Tanning ..... ,,	67,273	90,307	71,955	90,729
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground...cwt.	62,717	57,785	12,168	10,672
White Lead (dry) . ,,	15,190	20,479	26,639	34,293
All Other Sorts ... ,,	95,214	101,873	135,955	131,530
Total of Chemicals, Drugs, Dyes and Colours .....value	—	—	1,836,229	1,253,822

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	19,777	9,017	5,993	3,152
Acid Tartaric .... ,,	2,449	1,298	17,456	7,692
Ammonium Chloride (Muriate) .....tons	546	469	10,614	7,238
Ammonium Sulphate—				
To Spain and Canaries tons	22,855	28,827	204,505	201,607
,, Italy..... ,,	258	622	2,349	5,109
,, Dutch East Indies tons	186	451	1,760	3,539
,, China (including Hong Kong) tons	12,155	8,377	111,030	62,731
,, Japan..... ,,	20,693	1,506	190,091	10,817
,, British West India Islands and British Guiana tons	599	261	5,354	1,951
,, Other Countries ,,	15,765	30,229	140,883	214,392
Total..... ,,	72,511	70,273	655,978	500,146

	Quantities Month ended October 31, 1929.	Quantities Month ended October 31, 1930.	Value Month ended October 31, 1929.	Value Month ended October 31, 1930.
			£	£
Bleaching Powder ..cwt.	77,125	72,062	22,186	19,607
COAL TAR PRODUCTS—				
Anthracene .....cwt.	—	—	—	—
Benzol and Toluol galls.	27,114	206,243	2,965	18,379
Carbolic Acid ....cwt.	cwts. 2,791		25,766	6,942
Cresylic Acid ....galls.	17,195	200,420		20,651
Naphtha ..... ,,	3,727	6,231	465	635
Naphthalene (excluding Naphthalene Oil) cwt.	7,247	8,539	2,286	2,334
Tar Oil, Creosote Oil, etc. .....galls.	2,902,500	3,040,863	88,749	82,572
Other Sorts .....cwt.	30,239	176,070	31,403	12,417
Total.....value	—	—	151,694	143,930
Copper, Sulphate of .tons	783	1,274	18,726	24,937
Disinfectants, Insecticides, etc. .....cwt.	48,836	43,773	119,808	112,836
Glycerine, Crude ....cwt.	3,271	174	6,374	268
Glycerine, Distilled . ,,	8,054	9,118	20,448	23,672
Total..... ,,	11,325	9,292	26,822	23,940
POTASSIUM COMPOUNDS—				
Chromate and Bi-chromate .....cwt.	1,007	1,524	2,114	3,024
Nitrate (Saltpetre) ,,	792	1,031	1,509	1,941
All Other Compounds ,,	7,541	2,467	14,911	10,173
Total..... ,,	9,340	5,022	18,534	15,138
SODIUM COMPOUNDS—				
Carbonate, including Soda Crystals, Soda Ash and Bicarbonate cwt.	403,147	333,977	109,944	91,095
Caustic ..... ,,	107,888	129,974	107,958	84,950
Chromate and Bichromate .....cwt.	3,897	2,608	4,731	4,277
Sulphate, including Salt Cake .....cwt.	296,473	78,259	38,708	9,176
All Other Compounds cwt.	70,106	52,228	65,390	67,546
Total..... ,,	941,511	597,046	326,731	257,044
Zinc Oxide .....tons	180	357	6,902	8,590
Chemical Manufactures, etc., all other sorts value	—	—	376,839	246,808
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) ...value	—	—	757,353	1,371,058
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	159,757	107,856	16,130	10,967
All Other Sorts...value	—	—	322,887	209,634
Total..... ,,	—	—	339,017	220,601
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	13,474	12,436	86,282	93,343
Other Sorts ..... ,,	7,734	8,797	9,399	8,608
Total..... ,,	21,208	21,233	95,681	101,951
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground ..cwt.	2,193	1,335	1,009	678
White Lead (dry) . ,,	3,636	2,159	7,784	4,070
Paints and Colours in Paste Form .....cwt.	39,546	29,294	78,700	55,575
Paints and Enamels Prepared (including Ready Mixed) ..cwt.	52,936	36,286	155,931	14,423
All Other Sorts .... ,,	64,899	41,985	108,455	73,098
Total..... ,,	163,210	111,059	351,969	247,844
Total of Chemicals, Drugs, Dyes and Colours .....value	—	—	2,544,020	1,941,454

Re-exports

	Quantities Month ended October 31,		Value Month ended October 31,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1929.	1930.	1929. £	1930. £
Acid, Tartaric ....cwt.	74	108	579	640
Borax ..... ,,	1,010	293	1,000	162
Coal Tar Products value	—	—	50	27
Potassium Nitrate (Saltpetre) .....cwt.	61	52	76	55
Sodium Nitrate ... ,,	1,370	60	585	29
Tartar, Cream of . ,,	741	665	3,750	3,068
All Other Sorts ...value	—	—	18,967	13,977
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	17,583	9,366	1,861	963
Bark Cinchona, etc. cwt.	261	489	1,137	5,750
All Other Sorts ...value	—	—	38,555	32,354
DYES AND DYESTUFFS—				
Cutch .....cwt.	1,089	754	2,441	1,312
All Other Sorts.... ,,	239	285	929	911
Indigo, Natural.... ,,	2	26	55	731
Extracts for Tanning cwt.	1,270	336	1,850	603
PAINTERS' COLOURS AND MATERIALS.....cwt.	985	693	4,502	2,220
Total of Chemicals, Drugs, Dyes and Colours .....cwt.	—	—	76,428	63,615

Overseas China Clay Trade

Imports During October

A RETURN of the quantities and value of china clay, including china stone, imported into Great Britain and Northern Ireland during October is as follows :—

COUNTRIES WHENCE CONSIGNED.	QUANTITY. Tons.	VALUE. £
Germany	17	68
U.S. America	28	156
Total	45	224

Exports

Exports of china clay, including Cornish or china stone from Great Britain and Northern Ireland, during the month were :—

COUNTRY OF DESTINATION.	QUANTITY. Tons.	VALUE. £
Finland	1,068	2,475
Estonia	16	58
Latvia	783	1,033
Sweden	1,437	3,418
Norway	3,223	6,174
Denmark	689	1,738
Germany	4,029	8,176
Netherlands	3,676	8,786
Java	100	260
Belgium	2,034	3,659
France	2,521	5,575
Portugal	22	101
Spain	879	1,533
Italy	2,545	5,110
Greece	5	20
China	10	54
Japan	25	281
United States of America	18,840	40,075
Mexico	70	319
Brazil	7	49
Argentine Republic	3	12
Irish Free State	5	21
Channel Islands	407	900
Union of South Africa	2	18
British India	4,337	11,558
Madras	1	7
Bengal, Assam, Bihar and Orissa	353	1,422
Hong Kong	1	16
Australia	22	148
New Zealand	—	2
Canada	111	464
Newfoundland and Coast of Labrador	2,073	3,668
Total	49,294	107,130

Institution of Chemical Engineers

President's Annual Reception

THE annual reception by the President (Mr. J. Arthur Reavell) of the Institution of Chemical Engineers, drew a large and distinguished company to the New Burlington Galleries, London, on Wednesday evening. The three galleries were in use, one being set apart as a supper room, and an exhibition of oil and water-colour paintings and drawings by the New English Art Club attracted considerable interest. An enjoyable programme of music was rendered by the Evelyn Crudge Sextette. The guests, who were received by Mr. Reavell and his daughter, Mrs. J. F. Attenborough, included, besides a representative gathering from the various chemical and scientific bodies, many prominent people in public life. Among those who accepted invitations were :

The Marquess of Reading, Lord Greenway of Stanbridge Earls, Sir Robert Hadfield, Sir Alexander and Lady Gibb, Sir Horace and Lady Wilson, Sir Robert and Lady Robertson, Sir Harry McGowan, Sir Frederic and Lady Nathan, Sir William Bragg and Miss Bragg, Sir Robert and Lady Waley Cohen, Sir David Prain, Sir Joseph Nall, Sir Philip and Lady Hartog, Sir David Milne-Watson, Sir Harold and Lady Hartley, Col. Sir Thomas Purves, Sir Francis and Lady Goodenough.

Mr. and Mrs. H. Abbott, Mr. and Mrs. J. H. Aiken, Mr. J. R. W. Alexander, Mr. and Mrs. E. A. Alliott, Dr. G. W. Anderson, Prof. H. E. Armstrong and Miss Armstrong, Mr. Cyril Atkinson, K.C., M.P., Mr. and Mrs. J. A. Attenborough, Mr. J. F. Attenborough, Mr. H. Ballantyne and Miss Ballantyne, Dr. S. G. Barker, Dr. T. Barratt, Mr. T. Hedley Barry, Mr. and Mrs. E. R. Bolton, Prof. and Mrs. J. S. S. Brame, Dr. W. H. Brindley, Mr. W. J. A. Butterfield and Miss Butterfield.

Mr. W. A. S. Calder, Dr. and Mrs. H. T. Calvert, Dr. and Mrs. F. H. Carr, Mr. Ashley Carter, Mr. and Mrs. A. Chaston Chapman, Major A. G. Church, M.P., Dr. G. C. Clayton, Mr. F. W. Clifford, Mr. and Mrs. W. H. Coleman, Mr. R. L. Collett, Dr. H. G. Colman, Mr. A. J. C. Cosbie, Dr. and Mrs. H. E. Cox, Dr. and Mrs. W. Cullen, Mr. M. D. Curwen, Mr. and Mrs. W. A. Damon, Mr. and Mrs. W. F. Darke, Prof. C. R. Darling, Mr. Clement Davies, M.P., and Mrs. Davies, Mr. W. H. Dearden, Dr. F. B. Dehn, Prof. and Mrs. S. M. Dixon, Mr. and Mrs. A. A. Drummond, Mr. W. T. Dunn, Mr. E. C. Evans, Mr. E. V. Evans, Dr. and Mrs. J. Vargas Eyre, Dr. Margaret Fishenden, Prof. and Mrs. A. Fowler, Mr. and Mrs. C. S. Garland, Prof. and Mrs. W. E. Gibbs, Mr. and Mrs. C. J. Goodwin, Mr. and Mrs. F. A. Greene, Dr. A. G. C. Gwyer.

Dr. W. R. Halliday, Mr. F. E. Hamer, Dr. and Mrs. W. H. Hatfield, Mr. Noel Heaton, Prof. and Mrs. J. W. Hinchley, Mr. E. Hinks, Prof. E. T. Hobday, Mr. and Mrs. H. Hollings, Mr. J. F. W. Hooper, Dr. A. L. Howard, Dr. W. Hubball, Dr. and Mrs. L. A. Jordan, Dr. J. G. King, Mr. and Mrs. W. S. Knight, Dr. and Mrs. L. H. Lampitt, Dr. and Mrs. C. H. Lander, Mr. J. M. Leonard, Dr. and Mrs. R. Lessing, Dr. and Mrs. H. Levinstein, Dr. D. Jordan Lloyd.

Mr. W. Macnab, Prof. and Mrs. W. H. Merrett, Dr. and Mrs. S. Miall, Dr. H. H. Mills, Mr. Emile Mond, Dr. C. S. Myers, Mr. and Mrs. H. Nielsen, Dr. and Mrs. W. R. Ormandy, Prof. and Mrs. S. G. Paine, Dr. A. Parker, Dr. and Mrs. J. Gordon Parker, Mr. and Mrs. P. Parrish, Prof. J. C. Philip, Dr. R. H. Pickard, Mr. and Mrs. R. B. Pilcher, Mr. and Mrs. H. J. Pooley, Mr. B. D. Porritt, Mr. and Mrs. J. Davidson Pratt, Dr. J. G. Priestley, Prof. and Mrs. H. Raistrick, Prof. A. O. Rankine, Mr. Brian Reavell, Mr. Denys Reavell, Mr. and Mrs. W. Reavell, Mr. and Mrs. E. R. Redgrove, Mr. H. M. Ridge, Mr. and Mrs. F. Heron Rogers and Mrs. Tancred Cummins, Mr. and Mrs. J. F. Ronca, Dr. W. Rosenhain, Dr. and Mrs. R. Seligman, Dr. and Mrs. E. W. Smith, Mr. H. M. Spiers, Mr. and Mrs. H. Talbot, Prof. and Mrs. J. F. Thorpe, Dr. and Mrs. E. H. Tripp, Mr. and Mrs. S. J. Tungay and Miss Tungay, Mr. F. Twyman, Dr. A. J. V. Underwood, Mr. and Mrs. S. G. M. Ure, Dr. and Mrs. J. A. Voelcker, Dr. M. A. Whiteley, Mr. J. Arthur Williams, Mr. and Mrs. W. H. Woodcock, Mr. C. B. Woodley, Mr. W. J. U. Woolcock, Mr. S. J. Worsley, Dr. V. E. Yarsley.

Expert Translators

MANY highly qualified translators have been enrolled on the "Aslib" panel of expert translators since it was established by the Association of Special Libraries and Information Bureaux in July. Over thirty languages are represented, but the great value of the service offered by this scheme is that the members of the panel possess that expert knowledge of special subjects without which reliable translations cannot be made.

The range of subjects covered by the panel is wide. Especially strong in pure and applied science, medicine, chemistry, engineering, etc., it includes also men and women experienced in law, industry, commerce, and many other branches of knowledge. Particulars of the scheme may be obtained from the Bureaux, 26, Bedford Square, London, W.C.1.

Cohesive Attraction

Sir William Hardy's Address to Manchester Joint Meeting

SEVERAL hundred people were present on Friday, November 7, when Sir William Hardy, M.A., LL.D., F.R.S., addressed a joint meeting of the Manchester Literary and Philosophical Society and the Manchester Sections of the British Association of Chemists, the Institute of Chemistry, the Institution of Electrical Engineers, the Institute of Fuel, the Institution of the Rubber Industry, the Oil and Colour Chemists' Association, the Society of Dyers and Colourists, and the Society of Chemical Industry. Mr. C. E. Stromeyer, President of the Manchester Literary and Philosophical Society, occupied the chair. The meeting was held in the large hall of the College of Technology.

The subject of Sir William Hardy's lecture was "Problems of the Boundary State (including friction and lubrication)." He said that if a drop of water was hung on to a glass rod there was a field of attraction joining the water to the rod, another field of attraction in the rod itself, and yet another field of cohesive attraction holding the drop of water together. What he wished to speak about was the field of attraction between the water and the rod; the interfacial attraction between a solid and a fluid. The term "boundary state" was really introduced by Osborn Reynolds in his famous paper on "Lubrication," when he referred to complete lubrication, or lubrication when the pad of fluid was so thick that hydro-dynamic laws applied. Osborn Reynolds mentioned that when the gap between the two substances dealt with became sufficiently narrow then the boundary conditions functioned. Following upon the interface between the solid and the fluid there were orientated attraction, orientated stresses, or certain modified properties.

Characteristics of the Boundary State

All those modified properties contributed certain peculiar characteristics to the boundary state. The depth of the interfacial layer was very important. The depth of the layer at a free interface was one thing, but he wished to speak mainly of the depth of the boundary layer between two faces. It was important to understand that the depth of two faces coming together might be of much greater magnitude than the depth of the boundary layer in the case of what might be termed a free face; *i.e.*, a simple surface such as a piece of wood with a mass of fluid upon it. The depth of the layer might be determined by either the range of cohesive attraction or by orientation or polarisation of the molecules which spread from one molecule to another. This orientation would persist until it was upset by heat motions, and was no longer capable of withstanding the ordinary molecular shocks which tended to alter any orderly structure.

The region of the boundary state was of extraordinary interest. It was the region where molecules were strained, the region where there were energy levels, to use a cant modern phrase, the region where there were chemical processes, the region of catalytic reactions, and, above all, it was the region where there occurred those phenomena to which the term "living going on" could be applied. It was not a rash statement to make that life was a phenomenon of the boundary state; though, fortunately, he had not to deal with that point of view, but simply with its mechanical or geometrical peculiarities, because it was the region of friction and the region of adsorption.

The old Laplace theory of attraction would not cover the phenomena noticeable, and the alternative was to consider some form of polarisation. The "Leslie" theory of pressure could be regarded as being the strength of the chains in compression or as an osmotic pressure. If it was regarded as an osmotic pressure, then it became precisely similar to the osmotic pressure which caused the gel to swell. How was it possible to account for the fact that there was precisely the same effect in dry air as in fluids? It was known, through the examination of explosive waves, that there was a change of molecules in gas. Sir William Hardy said he had no explanation to offer, and could carry the matter no further. The real stumbling block was how to account for the air gap which existed. It might be considered that it was due to the presence of chains of solid particles. This was a very likely explanation; but all he could say, first of all, was that such particles must be perfectly elastic and always of the same size at intervals of years, because with a weight of loading of 7 grms. the value of 4 μ. remained the same for years. One experiment mentioned by the lecturer was to take a loaded glass cylinder and push it down on to a glass plate in a vacuum, when the Newtonian colours would be visible. The glass cylinder would be brought down to a certain short range of the order of 1 μ. There seemed to be no doubt at all that it was a true "Leslie" process, but how to explain it he could not say.

Upon the motion of Dr. Herbert Levinstein, seconded by Dr. R. H. Pickard, a hearty vote of thanks was accorded to the lecturer for his address.

Society of Public Analysts

Elections and Scientific Papers

AN ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, on Wednesday, November 5, the President, Dr. J. T. Dunn, in the chair. Certificates were read for the first time in favour of: Arthur Nicholls Ainsworth, B.Sc., Bertram Arthur Gough, William Henry Gough, M.Sc., A.I.C., William Henry Shilling, B.Sc., A.I.C. Certificates were read for the second time in favour of: Leonard Balmforth, B.Sc., F.I.C., Reginald Joseph Cole, B.Sc., Violet Dorothy Dudman, B.Sc., A.I.C., Frank George Edmed, O.B.E., B.Sc., A.R.C.Sc., F.I.C., Roy Gardner, D.Sc., F.I.C., William Victor Griffiths, B.Sc., A.I.C., Daoud Younis Haddad, B.Pharm., Percy George Terry Hand, F.I.C., Magnus Herd, B.Sc., A.R.T.C., F.I.C., Gilbert Underwood Houghton, B.Sc., A.I.C., Archibald Robert Jamieson, B.Sc., F.I.C., William Jefferys Lesley, M.Sc., Ph.D., A.I.C., Allison Reginald Murray MacLean, B.A., M.Sc., Ph.D., Frederick Henry Newington, F.I.C., and Colin Paterson, B.Sc., A.I.C.

The following were elected members of the Society: John Herbert Bushill, M.Sc., A.I.C., Edward Quentin Laws, B.Sc., A.I.C., and Hubert Taylor, B.Sc., A.I.C.

Analytical Papers

A paper on "The Determination of the Milk Proteins," by G. M. Moir, set out the results obtained by the author in the investigation assigned to him as Pedler Research Scholar of the Institute of Chemistry. The chemistry and separation of casein was first discussed, and it was shown that by mixing definite quantities of milk with a suitable acetic acid and sodium acetate buffer, maximum casein values were obtained between pH 4·5 and 4·7. Casein thus precipitated had been proved to be identical with the substance precipitated by acetic acid alone at pH 4·2. For the combined determination of albumin and globulin the filtrate obtained from the iso-electric precipitation of the casein was treated with trichloroacetic acid to give a concentration of about 4 per cent., and the nitrogen in the resulting precipitate determined by Kjeldahl's method. Casein and globulin were determined by precipitation with neutral saturated magnesium sulphate or sodium sulphate, and the individual proteins calculated by difference.

Another paper was entitled "The Lead Reduction Method for the Volumetric Determination of Tin, and the Interference of Copper and Antimony," by S. G. Clarke, B.Sc., Ph.D., A.I.C. Tin was determined by Powell's method of reduction from the stannic condition by means of lead, and direct titration with iodine, the reduction and titration being carried out in an atmosphere of carbon dioxide in the apparatus devised by B. S. Evans. The effect of copper was to cause the results for tin to be too low in direct proportion to the amount of copper present. Antimony also interfered, a considerable amount of tin being removed from the solution by the precipitation of the antimony; this reacted with the iodine during the titration.

"A New Method for Determining Traces of Chromium in Steel," by W. J. Agnew, B.A., described a very accurate method of determining chromium in steel consisting of oxidising it with potassium permanganate, and reducing the excess of permanganate by means of hydrochloric acid. The iron was then precipitated with sodium carbonate, and the dichromate determined by Evans's colorimetric method based on the purple colouration which it gave with diphenylcarbazide, a N/1,000 solution of potassium dichromate being used as the standard.

The Dyestuffs Act

To the Editor of THE CHEMICAL AGE.

SIR,—The argument has been frequently advanced against the renewal of this Act that under its operation the dyer or other user of dyestuffs has to pay a higher price than that current elsewhere, and that consequently our textile trades are prejudiced in competition upon foreign markets.

Under the "price-factor" system initiated by the Dyestuffs Advisory Committee the price of dyestuffs in this country has been fixed at a maximum of 1·75 times the pre-war price, whilst it is stated that 80 per cent. of the sales of home manufactured dyes are below this factor. In a report upon the German Chemical Industry, just issued by the Department of Overseas Trade, a comparison is given of the weights and values of the German exports of coal-tar dyestuffs in 1913 and 1929 respectively, the totals of which are as follows :—

1913.	1929.
Weight, 108,680 tons.	Weight, 42,953 tons
Value, £10,800,000	Value, £10,150,000

(N.B.—I have taken the £ as equal to 20 marks.)

From this it can readily be calculated that whereas the average price of all German dyestuffs exported in 1913 was 0·88 shilling; it was 2·1 shillings in 1929. In other words the present "price-factor" of German dyestuffs to customers outside Germany is 2·38!

It is, therefore, clear that if British consumers were obtaining to-day all their dyestuffs from Germany they would be paying a considerably higher price than they actually are. This takes no account of the probability that were the British dyestuff makers put out of existence the prices of German dyestuffs would undoubtedly rise still higher.

What, therefore, becomes of the argument that our textile trades are prejudiced?—I am, etc.,

November 12, 1930. ARTHUR G. GREEN.

British Photographic Research Association

Further Existence Unnecessary

THE British Photographic Research Association announces in a circular letter that it has been decided that the Association should go into voluntary liquidation. This decision has been reached in full accord between the Department of Scientific and Industrial Research and the manufacturer members of the Association.

Two main factors have necessitated this decision. The first is that important changes have taken place in the organisation of the industry itself; manufacturing interests have been consolidated and as a result the number of separate firms interested in the work of the Association has been considerably reduced. The second factor is a very marked increase in the research work carried out in the laboratories of the manufacturing firms themselves, an increase which has, to a large extent, been the outcome of the work of the Association. This widening of the outlook of the industry with regard to research is one of the results which it was hoped the Research Association would achieve. This development has been much fostered by the policy of the Director of the Association in keeping the scientific staffs of the manufacturing firms in close touch with the research work carried out in the laboratories of the Association, and also with the latest scientific developments likely to have direct application to problems of the industry.

The thanks of the industry are extended to the Department of Scientific and Industrial Research for the assistance and encouragement which they have given to the Association and especially to the Director of Research, Dr. T. Slater Price.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

159. (*Titanium Dioxide*).—An inquirer is anxious to be put into touch with merchants who are in a position to supply titanium dioxide 98/100 per cent.

Chemical Matters in Parliament

The Dyestuffs Act

IN the House of Commons on Tuesday Mr. Turner asked the President of the Board of Trade if he was aware of the handicap to British textiles of the Dyestuffs Act, and if he would consult the manufacturers and workpeople's association in the woollen and worsted industry as to the desirability or otherwise of not reimposing it.

Mr. Graham replied that the effect of the Act on the trades was being kept in mind, and he was consulting the association.

In reply to a further question Mr. Graham stated that no decision has been arrived at as to the ending or otherwise of the Act.

Tinfoil and Food

Sir C. Cayzer (House of Commons, November 6), asked the Minister of Health whether his attention had been called to the allegations in his current Departmental report that the practice of wrapping cheeses in tinfoil was a potential danger to the health of the consumer; and whether this assertion was thoroughly substantiated before being made.

Mr. Greenwood: The passage is an extract from a report of the analyst of a local authority quoted in the recent annual report of my Department. I am advised that the analyst's comments are well founded and that tin is an objectionable constituent of articles of food. I do not propose, therefore, to publish any qualification of those comments.

Geneva Gas Protocol

In reply to a question (House of Commons, November 7), Mr. Henderson stated that no special machinery had been set up by the League of Nations to ensure that undertakings given since the war to refrain from the use in warfare of poison gases and other noxious substances will be honoured. Under the Geneva Gas Protocol 27 nations have solemnly bound themselves to refrain from the use of asphyxiating gases, etc. Any infraction of the undertaking would be dealt with under existing League machine.

Chemical War Substances

Mr. G Shakespeare was informed in the House of Commons on Tuesday that no steps have been taken by the Board of Trade to control or supervise the manufacture or sale of chemicals or poisonous substances likely to be made use of in war.

Scientific Study of Textiles

"SOME applications of chemistry and physics to the examination of hosiery yarns," was the subject of an illustrated lecture delivered before the Nottingham section of the Society of Chemical Industry at University College, on Tuesday, November 4, by Mr. R. H. Pickard, D.Sc., F.R.S., director of research, British Cotton Industry Research Association. Mr. J. B. Firth, D.Sc., F.I.C., presided.

Dr. Pickard said they lived in an age when the designation "physicists" seemed to be almost entirely reserved for atom smashers and X-ray merchants, when students of general physics called themselves chemists, and when real chemists found they had to read more and more physics almost in self-defence. The scientific study of textiles could be said to date from since the war. Intensive study of textiles in all its branches had produced a mass of original information of scientific character, which had not, however, been assimilated by the industries.

Sir W. J. Pope's Norman Lockyer Lecture

PROFESSOR SIR WILLIAM J. POPE delivered the Norman Lockyer lecture of the British Science Guild, on Thursday, the tenth anniversary of the death of Sir Norman Lockyer, at the Goldsmith's Hall, London. A report of the lecture, which bore the title of "Science and Modern Industry," will appear in our next issue. Among the subjects which Sir William covered were the close parallels between the imaginative achievements of natural science and modern industry, the progress of the British dyestuffs industry and the unscientific policy of limiting the Dyestuffs Act to ten years, the shortcomings of agriculture in this country, and certain deficiencies in present-day chemical education.

From Week to Week

MR. CHARLES F. RATCLIFFE, J.P., managing director of Brotherton and Co., Ltd., has been elected chairman of the company in the place of the late Lord Brotherton.

INQUIRIES were held during 1929 into 88 boiler explosions, compared with 62 in 1928, according to the Board of Trade report. Nine persons were killed and 57 injured last year compared with 7 killed and 20 injured the previous year.

AT THE ROYAL INSTITUTION on Tuesday next Sir William Bragg will give the first of two lectures on two old friends of the Royal Institution, William Spottiswoode and Warren de la Rue. On Thursday Professor L. C. Martin commences a course of two lectures on Colour Vision.

THE LARGEST BY-PRODUCT COKING PLANT in Europe is being constructed for the Soviet Union in the Southern Urals at Magnitogorsk. The capacity of the plant will be 2,500,000 tons of coke per annum, and this will be associated with a steel mill, producing 2,100,000 tons of rolled steel annually.

SWISS IMPORTS of basic slag amounted to 32,525 tons during the first six months of 1930, compared with 26,550 tons in the same period last year. Imports of mixed and bone phosphates reached 11,095 tons this year (against 8,503 tons), potash salts 19,760 tons (against 15,750 tons), and sulphate of copper 432 tons (against 194 tons).

THE CHAMPION CUP offered by Imperial Chemical Industries, Ltd., for the best crop of potatoes grown this season in the Irish Free State, has been won by Mr. D. Brickley, of Clonalkilty, who produced a crop of 25 tons per statute acre. His fertilisers included 15 tons of farmyard manure, 10 cwt. special potato manure, 1 cwt. muriate of potash, and 1½ cwt. sulphate of ammonia.

THE PRIME MINISTER was admitted as a Fellow of the Royal Society at a meeting held at Burlington House, London, on Tuesday, when Sir Ernest Rutherford presided over a distinguished gathering which included Dr. W. A. Bone, Lord Rayleigh, Professor F. G. Donnan, Sir Frederick Gowland Hopkins, Sir William Bragg, Professor J. F. Thorpe, Professor G. T. Morgan and Professor J. C. Philip.

FINANCIAL STRINGENCY in Australia had resulted in a considerable reduction in the funds available for the Commonwealth Council for Scientific and Industrial Research, said Dr. Rivett, chief executive officer of the Council at a meeting in London on Wednesday. The effects were being felt in all forms of work and he made a special appeal for support for research work in connection with the Australian wool industry.

THE Japanese Imperial Oxygen Co., Ltd., capitalised at 2,400,000 yen, paid up fully, has been formed by the Sumitomo Co. and the officials of L'Air Liquide of Kobe, by taking over the business of the latter firm, formerly producers of oxygen, nitrogen, and other gases. Because of an intensive campaign in Japan to use home manufactured products, reports the U.S. Assistant Trade Commissioner at Tokyo, demand for the output of the French firm declined and therefore, it seemed desirable to combine with Japanese capital.

THE MARKET for disinfectants, insecticides and animal dressings in China is the subject of a confidential report prepared by the Department of Overseas Trade from information furnished by the Acting Commercial Counsellor at Shanghai. United Kingdom firms desirous of receiving a copy should communicate with the Department at 35, Old Queen Street, London, quoting Reference B.X. 6838. A similar report has been prepared on the market for paints, varnishes, etc., in the French zone of Morocco, and may be obtained on quoting Reference B.X. 6844.

THE WILL of the late Lord Brotheron has now been filed for probate. In addition to the bequests announced in THE CHEMICAL AGE last week he has left several large sums to individuals, including £5,000 to Mr. Charles Ratcliffe, the new chairman of Brotherton and Co., Ltd., £5,000 to Mr. Walter Denton (director and secretary), £2,000 to Mr. John Russell (director), £500 each to Mr. Benjamin Watmough and Mr. John Butterworth, Ammonia Works, Wakefield (former works managers) and £200 to Mr. James Lockie Harle (former secretary of the company). In the case of the bequest of £1 to each employee for each continuous year of service, service in the Forces during the War is to count as if spent with Brotherton and Co., Ltd.

MR. F. E. HAMER, J.P., was the chairman, and Sir Thomas Inskip, K.C., and Mrs. Lucy Masterman were the speakers, at the annual peace demonstration on Armistice Sunday at the Chiswick Empire, attended by some 2,500 people.

TWO OF THE LARGEST electric resistance furnaces ever built in this country, each with a capacity of 7 tons, are among those which have recently been ordered by English manufacturers from Wild-Barfield Electric Furnaces, Ltd., Holloway, London.

AN ESCAPE OF GAS occurred on Tuesday at the synthesis plant of Synthetic Ammonia and Nitrates, Ltd., and three men affected by the fumes were taken to hospital. The escape was confined to a small area of the works, and the condition of the men was not regarded as serious.

PARTICULARS of the 1931 Associate Membership examination of the Institution of Chemical Engineers, together with application forms, which must be returned by December 22, and the memorandum on "The Training of a Chemical Engineer" may now be obtained from the Hon. Registrar of the Institution, Abbey House, Westminster.

THE LONDON SECTION of the Society of Chemical Industry has just issued an address list, corrected to October 1, 1930, setting out the home and business address of each of its members. Business telephone numbers are also given and, where they exist, the home telephone numbers. The volume runs to 90 pages, and is prefaced by a list of the rules and officers of the Section.

THE APPEAL FUND for the new hospitals centre for Birmingham has now reached a total of £576,200. The contributions include—Imperial Chemical Industries, £5,000; Brotherton and Co., Ltd., £2,000; Albright and Wilson, Ltd., £1,200; Mr. E. R. Canning, £1,000; H. Wiggin and Co., £350; Mr. W. E. Wilson and Mr. W. J. Wilson, £250 each; employees, Albright and Wilson, £100.

THE GERMAN ACETA CO. and the Deutsche Rhodiaseta Co., of Frankfurt, have reduced their prices for acetate artificial silk by 10 per cent., or an average of 1·25 mark per kilogramme. This follows the recent decrease in the price of viscose silk and the reductions in price made by French and English artificial silk companies. A like reduction in the price of its silk is also expected to be made by the Tubize Co.

THE BOARD OF TRADE announces that Mr. Alexander Levin and Mr. Jacob Janson, who were appointed under Article 2 of the Anglo-Soviet Temporary Commercial Agreement of April 16, 1930, to represent Mr. Saul G. Bron and to conclude transactions in the United Kingdom for and on behalf of the Union of Soviet Socialist Republics, are no longer empowered to undertake these duties. Mr. Alexei Lisereff will continue to represent Mr. Bron.

THE FIRST ANNUAL MEETING of Chemical and Wood Industries, Ltd., the holding company of the Anglo-Yugoslavian Wood Distillation Co., was held in London on Wednesday. Major C. F. Entwistle (chairman) said considerable improvements in plant and organisation had taken place during the past year, but their trade had been affected by market depression and Soviet dumping. Given normal conditions, however, satisfactory results could be anticipated in the future. Political affairs in Yugoslavia appeared stable and the country offered great and safe opportunities for industrial undertakings.

THE CHEMICAL INDUSTRY CLUB at its annual meeting elected Professor A. Smithells president in place of Lord Melchett, and re-elected Mr. J. F. Ronca as chairman, and Mr. Arthur J. Chapman as honorary secretary. Mr. Mellor-Jones, who had served the club over a long period as honorary treasurer, felt unable to continue, and a successor was found in Mr. F. A. Greene. Six vacancies occurred on the executive committee, and they were filled by the election of Messrs. James Blair, R. L. Collett, P. H. Fairbrother, G. W. S. Marlow, T. Davidson Pratt and H. Talbot. Acknowledgment was made of the excellent services of the secretary, Mr. Arthur Williams, and the steward and staff.

Obituary

SENATOR THOMAS COLEMAN DU PONT, a former president of the Du Pont de Nemours Co., at Wilmington, Delaware, U.S.A., on November 11, aged 67.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

334,754. Dyes and Lakes. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort--on-Main, Germany. Application date, October 12, 1929.

Diazotised aminohydroquinone dialkyl ethers or derivatives are coupled with 1-benzoylamino-8-naphthol-4 : 6-disulphonic acid or derivatives substituted in the benzene nucleus. The dyes obtained may be converted into lakes with alkaline earth metal salts. The products are employed as colours for wallpapers or nitrocellulose lacquers.

334,790. Electrolysis. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 20, 1929. Addition to 319,656.

In the purification of phosphoric acid by electrolysis as described in specification 319,656 (see The Chemical Age, Vol. XXI, p. 534), when the crude acid contains an insufficiency of heavy metal salt a small amount of copper phosphate is added before refining to promote the deposition of the arsenic present.

334,820. Aluminium Alcoholates. A. Wacker Ges. fur Elektrochemische Industrie Ges., 20, Prinzregentenstrasse, Munich, Germany. International Convention date, June 13, 1929.

Aluminium and an alcohol are treated with chlorine or a compound yielding chlorine, in an indifferent solvent. Aluminium alcoholate containing several per cent. of aluminium chloride is obtained, and may be used as a catalyst for the conversion of acetaldehyde into ethyl acetate. Some examples are given.

334,847. Hydroxyaryl Methanes. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 1, 1929.

Hydroxy-diaryl- or triaryl-methanes containing one or more halogen phenol radicles are used for immunising seed grain, or other plant seeds. A suitable product is obtained by condensing formaldehyde with two molecular proportions of *p*-chlor-phenol in the presence of sulphuric acid. Other suitable products include methylene-bis-2 : 4-dichlor-phenol, the condensation products of formaldehyde and two molecular proportions of *m*-chlor-phenol, 6-chlor-3-cresol or 6-chlor-2-cresol, the condensation products of *p*-chlor-benzaldehyde or *p*-diethylamino-benzaldehyde and two molecular proportions of *p*-chlor-phenol.

334,856. Carbon Disulphide and Sulphuretted Hydrogen. H. Oehme, 5, Wipperfurtherstrasse, and Chemische Fabrik Kalk Ges., 1, Kalker Hauptstrasse, both in Kalk, near Cologne, Germany. International Convention date, October 2, 1928.

Specification No. 314,060 (see The Chemical Age, Vol. XXI, p. 179), describes the manufacture of carbon disulphide from hydrogen sulphide. In the present process the mixture of hydrogen sulphide and hydrogen separated from the carbon disulphide is returned to the process instead of being treated to extract hydrogen sulphide. The hydrogen sulphide may alternatively be removed and used for the manufacture of sulphur or sulphur-containing salts by absorption in alkali carbonate, etc.

334,862. Sulphur Trioxide. S. Robson, The Bungalow, St. Andrews Road, Avonmouth, and P. S. Lewis, Delamere House, St. Andrews Road, Avonmouth. Application date, June 8, 1929.

To obtain catalysts for the oxidation of sulphur dioxide a vanadium compound is mixed with pumice, kieselguhr, or dried, precipitated silicic acid, and treated when cold and in presence of moisture, with sulphur dioxide until the product is acid to litmus and gas is no longer absorbed. The vanadium compound must be such as will react with sulphur dioxide to produce vanadyl sulphate. The mixture is pelleted with a binder such as sodium silicate and gums and promoters such as salts of tin, manganese, or bismuth may be added. The catalyst is immune to poisons and gives a 94–95 per cent. yield.

334,872. Dyes and Intermediates. W. Smith, S. G. Willimott, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, March 5, 1929.

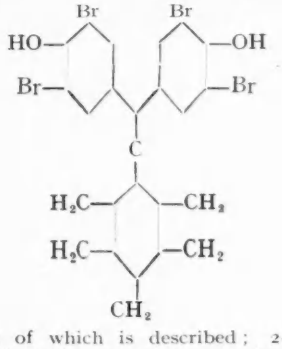
2-Benzoyl-benzoic acids are condensed with anthraquinones by means of an amino group in the one, and a halogen atom in the other which are in *o*-position to a nitro group, and the products may be reduced to phenazines. In an example, 4^1-chlor-3^1-nitro-2-benzoyl-benzoic acid is treated with methyl alcohol and sulphuric acid to obtain the methyl ester, which is then condensed with 1- amino-anthraquinone by heating in nitrobenzene in the presence of copper bronze and soda ash. The product is brown and dyes wool or acetate silk. If the reduction is effected with sodium sulphide in alcohol, 2^1-carboxy-benzoyl-anthraquinone-phenazine is obtained, and dyes wool dark blue shades from an acid bath. Further treatment with dehydrating agents yields a blue vat dye.

334,874. Lakes. Sir G. C. Marks, London. From E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. Application date, March 8, 1929.

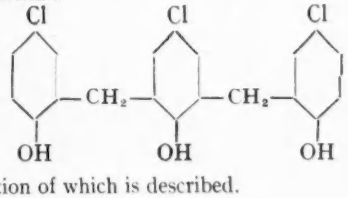
Oil and water-insoluble lakes of azo dyestuffs are obtained by adding a metallic compound to a mixture of an azo dye of acidic character and a rosin soap in aqueous medium. The rosinate is present in the precipitate in the proportion of 5–60 per cent. In an example, 2-naphthylamine-1-sulphonic acid is diazotised and coupled with β-naphthol and then mixed with a solution of sodium rosinate, and the mixture precipitated with calcium chloride or barium chloride, and boiled. Other examples are given.

334,876. Hydroxyaryl Methanes, Antiseptics. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 1, 1929.

Hydroxy-diaryl-methanes or triaryl-methanes containing one or more halogen-phenol radicles are used as antiseptics in the proportion of 1 : 1,000 for preserving adhesives such as starch paste. In an example, formaldehyde is condensed with two molecular proportions of *p*-chloro-phenol in the presence of sulphuric acid. Other compounds specified include methylene-bis-2 : 4-dichloro-phenol ; the condensation products of formaldehyde with two molecular proportions of *m*-chloro-phenol, 6-chloro-3-cresol or 6-chloro-2-cresol ; the condensation products of *p*-chloro-benzaldehyde or *p*-diethylamino-benzaldehyde and two molecular proportions of *p*-chloro-phenol ; the condensation product having the formula



the preparation of which is described ; 2-hydroxy 5 : 4-dichloro-diphenyl methane, and the condensation product having the formula



the preparation of which is described.

334,878. DYES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 11, 1929.

4 : 4^1-dimethyl 6 : 6^1-dihalogen-thio-indigos are treated with a reducing agent other than a hydrosulphide, such as sodium hydrosulphite, in the presence of a smaller quantity of an alkaline agent such as caustic soda or potash, sodium carbonate or ammonia, that is used for vatting the dyestuffs. The products are stable and are insoluble or sparingly soluble in aqueous alkali.

334,886. CONDENSATION PRODUCTS OF PHENOLS AND ARALKYL COMPOUNDS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 10, 1929.

Phenols are condensed with aralkyl compounds such as aralkyl halides, alcohols and ω-sulphonic acids and then sulphonated, or sulphonated phenols may be condensed with aralkyl compounds. The products are employed for moth-proofing wool. Examples are given of the treatment of woollen fabrics with sulphonated condensation products of *p*-chlor-phenol and tetrachlor-benzyl chloride, 2 : 4-dichlor-phenol and 2 : 6-dichlor-benzyl-chloride, β-naphthol and 2 : 4-dichlor-benzyl-ω-sulphonic acid, 2 : 4-dichlor-benzyl-alcohol or a mixture of 2 : 3 : 4- and 2 : 3 : 5-trichlor-benzyl-chlorides or alcohols. β-naphthol may also be condensed with various esters and ethers.

334,887. TRIAZINES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 10, 1929.

A 2 : 4-di (nitrophenyl)-6-hydroxy-1 : 3 : 5-triazine is treated with a phosphorus halide such as phosphorus oxychloride or pentabromide to obtain 2 : 4- di (nitrophenyl)-6-halogen-1 : 3 : 5-triazines, which are intermediates for dyestuffs and pharmaceutical products. The halogen is readily replaced by groups attached to a nitrogen, oxygen or sulphur atom with a reactive hydrogen atom.

334,902. DYES. D. A. W. Fairweather, J. Thomas and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, March 7, 1929.

Tetrasulphuric esters of tetrahydro-dianthraquinone-azines are obtained by oxidising a disulphuric ester of 2-amino-anthraquinone or a substitution product having the 1-position free, in the presence of an alkali, and isolating the product by salting out or by evaporation. Examples are given of the preparation, and purification of the tetrasulphuric esters obtained from the sodium or potassium salts of 2-amino anthrahydroquinone-9 : 10-disulphuric acid ester and of 2-amino-3-chlor-anthrahydroquinone-9 : 10-disulphuric acid ester.

334,919 and 334,920. DYES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 11, 1929. Additions to 334,878. (See above.)

334,919. Reduction compounds of 4 : 4^1-dimethyl-6 : 6^1-dihalogen-thioindigos are obtained by treating the dyestuffs with caustic soda and hydrosulphite, and then with carbonic acid or sulphurous acid. The reduction is facilitated by adding an alcohol.

334,920. The process described in specification 334,919 above is extended to 6 : 6^1-diethoxy-thioindigo, and an example is given.

334,924. METHANOL. British Celanese, Ltd., 22, Hanover Square, London, W. Bader and E. B. Thomas, of British Celanese, Spondon, near Derby. Application date, April 12, 1929.

Methanol is obtained from oxides of carbon and hydrogen at high temperature and pressure using zinc sulphide as catalyst, with or without a chromium compound as a promoter. To obtain the catalyst, a solution of zinc and chromium nitrates may be precipitated with sodium sulphide and the precipitate dried. The synthesis may be effected at 360°–400° C. and 100 atmospheres pressure.

334,976. METAL CARBONYLS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 24, 1929.

Carbon monoxide is passed through a series of reaction vessels charged with carbonyl-forming materials until the first vessel becomes exhausted. This vessel is then cut out and recharged with fresh material and placed at the other end of the series. The velocity of the gas is such that no carbon monoxide remains at the end of the series. An alternative method is described in which the solid, pasty or suspended material is conveyed through the series.

334,986. ACETIC ANHYDRIDE. Imperial Chemical Industries, Ltd., Millbank, London, H. Hepworth, Hazeldene, West Drive, Cheam, Surrey, and F. D. Leicester, 128, Mill Lane, Sutton, St. Helens, Lancs. Application date, July 4, 1929.

Vapour from acetic acid is passed over active carbon at a temperature just above the boiling point of the anhydride. The adsorbed acetic anhydride and acetic acid are removed by heating the active carbon at reduced pressure with or without a solvent such as ethyl acetate or an inert gas. The heating is at 150° C. at 10 inches mercury pressure and then at 300° C. at 1 inch mercury pressure.

335,007. DICALCIUM PHOSPHATE. A. Holz, 18, Sherman Place, Irvington, N.J., U.S.A., and T. van D. Berdell, 39, Broadway, New York. Application date, July 30, 1929.

Rock phosphate is treated with a mixture of hydrochloric and sulphuric acids in equivalent amounts, and the calcium sulphate filtered off. The solution of calcium chloride and phosphoric acid is treated with sodium hydroxide and calcium hydroxide to obtain dicalcium phosphate and a solution of sodium chloride. The latter solution may be electrolysed and the chlorine evolved passed with sulphur dioxide into water to obtain the mixture of hydrochloric and sulphuric acids required.

335,014. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 7, 1929.

The products obtained by the condensation of 5 : 8-dihalogen-1 : 2-benzanthraquinones with 1-aminoanthraquinone, 1-amino 5-benzoylamino-anthraquinone, or 1-amino-4-benzoyl-amino-anthraquinone, as described in Specification 334,565 (see THE CHEMICAL AGE, Vol. XXIII, p. 435) are treatd with acid condensing agents such as aluminium chloride in pyridine to obtain products which dye cotton brown shades.

335,043. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 28, 1929. Addition to 318,107. (See THE CHEMICAL AGE, Vol. XXI, p. 428.)

Vat dyestuffs giving bluish-green shades fast to light are obtained by condensing α-oxyanthracene with a 4-methyl-5-halogen-7-alkoxyisatin-α-derivative, *e.g.*, with 4-methyl-5-chlor- or 4-methyl-5-brom-7-methoxyisatin-α-chloride. These isatins are obtained by halogenating the parent isatins in the presence of glacial acetic acid or sulphuric acid, and the chlorides are obtained by treatment with phosphorus pentachloride in chlorbenzene.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—309,594 (Electro-Metallurgical Co.), relating to smelting of ores, see Vol. XXI, p. 7 (Metallurgical Section) ; 310,972 (G. Jakova-Merturi), relating to purifying sulphur and obtaining carbon disulphide and sulphur oxides, see Vol. XXI, p. 10 ; 317,296 (Schering Kahlbaum Akt.-Ges.), relating to ether derivatives of aminobenzoic acid and alkamine esters, see Vol. XXI, p. 362.

Specifications Accepted with Date of Application

310,415. Carrying-out chemical reactions, Apparatus for. British Celanese, Ltd. April 25, 1928.

315,400. Dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. July 13, 1928.

316,103. Hydrocarbon-containing metals and alloys, Method of manufacturing. Bayerische Metallwerke Akt.-Ges. July 20, 1928.

316,268. Ortho hydroxy azo-dyestuffs containing chromium, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) July 26, 1929.

336,811. Butyl alcohol, Manufacture of. H. D. Elkington. (*Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij*) February 17, 1930.

338,938. Azo-dyestuffs, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*) July 10, 1929.

336,948. Magnetic alloys, Manufacture of. W. S. Smith, H. J. Garnett, and W. F. Randall. June 22, 1929.

336,944. Hydrogen and gases containing hydrogen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 8, 1929.

336,954. Iron or steel, Manufacture of. H. Hagemann. July 18, 1929.
336,960. Aliphatic anhydrides, Manufacture of. H. Dreyfus. July 22, 1929.
336,970. Working-up of chromium ores. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) July 22, 1929.
336,971. Substantive dyeing ortho-carboxy azo-dyestuffs containing copper, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) July 22, 1929.
336,982. Dyestuff intermediates, Production of. W. Smith, J. Thomas, and Scottish Dyes, Ltd. April 16, 1929.
336,983. Dyestuffs and dyestuff intermediates, Manufacture of. W. Smith, L. J. Hooley, J. Thomas, and Scottish Dyes, Ltd. April 16, 1929.
336,991. Destructive hydrogenation. C. F. R. Harrison and Imperial Chemical Industries, Ltd. July 19, 1929.
336,999. Ethylene, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) May 24, 1929.
337,014. Oxygenated organic compounds, Manufacture of. H. Dreyfus. July 24, 1929.
337,019. Polymerisation of diolefines. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) May 25, 1929.
337,021. Wool dyestuffs of the anthraquinone series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) June 21, 1929.
337,025. Acetyl methyl carbinol and diacetyl, Preparation of. T. H. Verhave, Sen. June 26, 1929. Addition to 315,264.
337,028. Hydrogenation of coal. Imperial Chemical Industries, Ltd., R. Holroyd and C. Cockram. July 18, 1929.
337,047. Aminohydroxy anthraquinones and substitution products thereof, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) July 26, 1929.
337,053. Aliphatic acids and their esters, Manufacture of. British Celanese, Ltd., and W. Bader. July 27, 1929.
337,061. Substitution products of sulphur dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) July 27, 1929. Addition to 317,776.
337,088. Acetylene and hydrogen in the electric arc, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 7, 1929.
337,099. Light metal alloy. H. T. Tillquist and J. Harden. August 17, 1929.
337,103. Amino compounds of the cyclo-hexylbenzene series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) August 21, 1929.
337,109. Phosphoric acid and hydrogen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 24, 1929.
337,123. Phosphorus oxychloride, Production of. J. S. Dunn, F. Briers, and Imperial Chemical Industries, Ltd. September 6, 1929.
337,136. Readily soluble salts of acridine bases substituted in 9-position by an amino group. I.G. Farbenindustrie Akt.-Ges. October 8, 1928.
337,160. Tungsten, Manufacture of. J. Gray. (*A. Pacz.*) October 3, 1929.
337,224. Direct dyeing disazo-dyestuffs, Manufacture of. J. R. Geigy Akt.-Ges. November 15, 1928.
337,289. 1-Chloromethylnaphthalene, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 12, 1929.
337,296. Tetrahydrofurfuryl alcohol, Manufacture of. Imperial Chemical Industries, Ltd. (*E. I. Du Pont de Nemours and Co.*) January 25, 1930.
337,299. N-substituted benzimid-azolone-arsinic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 11, 1929. Addition to 256,243.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Ashcroft, E. A. Treatment of ores containing copper. 33,529. November 7.
—— Production of metal chlorides, etc. 33,530. November 7.
—— Recovery of zinc, etc., salts from blast furnace lags, etc. 33,531. November 7.
—— Extraction of precious, etc., metals from ores, etc. 33,532. November 7.
—— Electrolysis of zinc chloride, etc. 33,533. November 7.
Blagden, J. W., Clarke, G. C. H., and Howards and Sons, Ltd. Manufacture of catalysts. 33,418. November 6.
Bloxam, A. G., and Soc. of Chemical Industry in Basle. Dyeing textiles. 33,189. November 4.
Caledonian Electro-Chemical Co., Ltd., and Griffith, C. O. Antimony sulphide. 33,345. November 6.
Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Preserving natural varieties of rubber, etc. 33,305. November 5.
—— Manufacture of azo dyestuffs containing copper. 33,447. November 6.
—— Manufacture of derivatives of *a-a-a* tribromethane. 33,448. November 6.
—— Manufacture of soot, etc. 33,574. November 7.
—— Manufacture of homologues of iodomethane sulphonic acid, etc. 33,575. November 7.
—— Manufacture of 1 : 7-dihydroxynaphthalene. 33,692. November 8.
—— Manufacture of 2 : 6-dihydroxynaphthalene-3 : 7-dicarboxylic acid. 33,693. November 8.
Groves W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of shaped bodies from artificial resins. 33,020. November 3.
—— Manufacture of aroyl-acetic-acid-arylides. 33,022. November 3.
—— Manufacture of aromatic condensation products. 33,263. November 5.
—— Manufacture of cyclic diketones. 33,265. November 5.
—— Manufacture of azo-dyestuffs insoluble in water. 33,552. November 7.
—— Constructing acid-proof masonry. 33,553. November 7.
—— Anti-rust agents. 33,703. November 8.
Higgins, E. B. Dyestuffs, etc. 33,092. November 4.
Hooper, L. D. Production of aluminium, etc. 33,073. November 4.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Treatment of organic liquids to facilitate storage, etc. 33,184. November 4. (July 4, 1929.)
—— Treating fatty oils, etc. 33,275. November 5.
—— Desulphurization of gases. 33,276. November 5.
—— Isolation of alcohols of high molecular weight. 33,277. November 5.
—— Manufacture of hydrocyanic acid from heavy metal cyanides. 33,278. November 5.
—— Manufacture of azo-dyestuffs insoluble in water. 33,552. November 7.
—— Conversion of methane, etc. 33,699. November 8.
I.G. Farbenindustrie Akt.-Ges. Manufacture of nitro-5-hydroxypyridine, etc. 33,021. November 3. (Germany, November 7, 1929.)
—— Manufacture of derivatives of pyracridone. 33,047. November 3. (Germany, September 29, 1928.)
—— Production of patterned films, sheets, and coatings. 33,264. November 5. (Germany, November 5, 1929.)
—— Mothproofing. 33,573. November 7. (Germany, December 31, 1929.)
Imperial Chemical Industries, Ltd. Vulcanisation of rubber, etc. 32,997. November 3.
—— Artificial resinous products. 33,129. November 4.
—— Fabrication of metallic structures. 33,295, 33,296. November 5.
—— Apparatus for cleaning metal strip. 33,607. November 7.
—— Composite articles, etc. 33,685. November 8.
Norddeutsche Affinerie. Production of arsenious oxide from arsenical products. 33,054. November 3. (Germany, November 26, 1929.)
Schering-Kahlbaum Akt.-Ges. Catalytic conversion of hydrocarbons into camphene. 33,046. November 3. (Germany, November 21, 1929.)

Italian Rayon Production

ITALIAN rayon production, which during the first seven months of the year had been maintained at an average of over two and a half million kilos monthly, suddenly slumped to 1,516,693 kilos in August, against 2,560,000 kilos in August, 1929. This followed a fall in exports from 2,029,100 kilos in June to 709,200 kilos in July, rising to 877,000 kilos in August. Italy is the world's second largest rayon producer, and this change in production policy should have a profoundly beneficial effect on the world industry by hastening the clearance of stocks.

Competition of Leather Substitutes

THE need for improving the quality of hides to meet the growing competition from leather substitutes is dealt with in a report of the Imperial Economic Committee on hides and skins. "It is inconceivable," states the report, "that leather will ever go out of general use, but the farmers must recognise that there are substitutes in the market and that under present conditions, especially in times of large demand and high price, the supply of sound leather is insufficient, and the substitutes gain a hold in the various of the leather industries which they do not wholly lose in times of subsequent less demand."

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 10s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅛d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3¾d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included: £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¼d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5½d. to 7½d. per lb. Crude 60's 1s. 4½d. to 2s. per gall. August/December.

ACID CRESYLIC 99/100.—2s. 1d. to 2s. 3d. per gall. B.P., 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 7d. to 2s 10d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 1s. 11d. to 2s. Dark, 1s. 6d. to 1s. 7d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4⅜d. to 5¼d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 8d. to 9d. per gall.; Standard Motor, 1s. 3½d. to 1s. 4½d. per gall.; 90%, 1s. 5d. to 1s. 6d. per gall.; Pure, 1s. 8d. to 1s. 9d. per gall.

TOLUOLE.—90%, 1s. 8d. to 1s. 10d. per gall. Pure, 1s. 9½d. to 2s. 1d. per gall.

XYLOL.—1s. 4½d. to 1s. 9d. per gall. Pure, 1s. 7½d. to 1s. 11d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6d. to 6⅜d. per gall. Home, 4d. per gall. d/d. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1½d. to 1¾d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 8¾d. per gall. Solvent, 90/160, 1s. 2½d. to 1s. 3d. per gall. Solvent, 95/160, 1s. 3½d. to 1s. 5d. per gall. Solvent 90/190, 11d. to 1s. 2d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £3 to £5 per ton. Whizzed, £4 to £5 per ton. Hot-pressed, £8 per ton.

NAPHTHALENE.—Crystals, £10 per ton. Purified Crystals, £14 10s. per ton. Flaked, £11 per ton.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 6d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8¼d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8¼d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 8d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 4d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. to £8 per ton. Grey, £14 to £15 per ton. Liquor, 9d. per gall.

ACETONE.—£74 to £75 per ton.

CHARCOAL.—£6 5s. to £8 3s. per ton, according to grade and locality.

IRON LIQUOR.—10d. to 1s. 2d. per gall.

RED LIQUOR.—8d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—2s. 11d. to 3s. 1d. per gall. Solvent, 4s. per gall.

WOOD TAR.—£4 5s. per ton.

BROWN SUGAR OF LEAD.—£37 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£6 to £7 10s. per ton, according to quality.

CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—3¼d. to 4 1/16d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4¾d. to 5½d. per lb.; Dark, 4½d. to 5d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
VERMILION, PALE OR DEEP.—6s. 6d.–7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£38 5s. per ton, for ½ ton lots, £37 5s. for 1 ton, smaller quantities £39 5s., delivered, barrels free.
ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 5d. to 1s. 5½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. to 1s. 0½d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—8s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—6s. 6d. per lb.
BISMUTH CITRATE.—6s. 9d. per lb.
BISMUTH SALICYLATE.—6s. 7d. per lb.
BISMUTH SUBNITRATE.—5s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 4s. 4d. per lb.
BISMUTH OXIDE.—8s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. per lb.
BISMUTH SUBGALLATE.—6s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—7s. 3d. per lb.
CAFFEIN CITRAS.—5s. 3d. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 6d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
EMETINE HYDROCHLORIDE.—58s. 6d. per oz.
EMETINE BISMUTH IODIDE.—33s. per oz.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s. 9d. to 10s. 6d. per oz.
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—27s. 6d. per oz.
HYDRASTINE HYDROCHLORIDE.—85s. per oz. for small quantities.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb., for 28-lb. lots. Green, 3s. 1d. per lb., list price. U.S.P., 3s. 3d. per lb. list price
IRON PERCHLORIDE.—18s. to 20s. per cwt. according to quantity.
IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. 3d. per lb. net; Synthetic, 8s. 6d. to 10s. 6d. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. 3d. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
PILOCARPINE NITRATE.—10s. 6d. per oz.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—89s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 2d. to 3s. per lb.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1 cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
QUINOPHAN.—B.P.C., 14s. 6d. to 16s. 6d. per lb. for cwt. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—18s. 6d. per lb.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 10d to 2s. 8d. per lb. B.P.C. 1923, and U.S.P., 2s. 2d. to 3s. per lb.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 7s. 3d. to 8s. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. 6d. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—7s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—7s. 6d. per lb.
CITRAL.—7s. 6d. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL (PALMAROSA).—17s. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—10s. 9d. per lb.
LINALOL, EX BOIS DE ROSE.—6s. per lb. Ex Shui Oil, 6s. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—8s. 6d. per lb. Ex Shui Oil, 8s. 6d. per lb.
MUSK KETONE.—30s. per lb.
MUSK XYLOL.—6s. 3d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—46s. per lb.

(*Essential Oils on page* 465.)

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, November 13, 1930.

THE increased volume of business has been maintained with prices rather firm. Export business has also been good.

General Chemicals

ACETONE.—In steady demand at £71 10s. to £80 per ton, according to quantity.

ACID ACETIC.—Unchanged at £36 5s. to £38 5s. for technical 80%, and £37 5s. to £39 5s. for pure 80%, and in good request.

ACID CITRIC.—Unchanged at about 1s. 6½d. per lb., less 5%.

ACID FORMIC.—£38 per ton for 85% and in steady demand.

ACID LACTIC.—Steady at £41 to £42 per ton for the 50% by weight, pale quality.

ACID OXALIC.—Firm at £30 7s. 6d. to £32 per ton, according to quantity. The good demand is maintained.

ACID TARTARIC.—Still very firm at about 1s. per lb., less 5%. The improved demand continues.

ALUMINA SULPHATE.—£7 15s. to £8 5s. per ton, according to quantity.

ARSENIC.—About £18 5s. to £18 10s. per ton.

CREAM OF TARTAR.—Very firm at 88s. per cwt., ex warehouse London, and in steady request.

COPPER SULPHATE.—£21 to £21 10s. per ton, free on rails London.

FORMALDEHYDE.—In good demand at about £32 per ton, ex wharf, London.

LEAD ACETATE.—Unchanged at £35 15s. per ton for white and £34 15s. per ton for brown.

LEAD NITRATE.—£29 10s. per ton, with improved demand.

LITHOPONE.—Steady at £19 to £22 per ton, according to grade and quality.

CARBONATE OF POTASH.—96/98% arsenic free, £28 to £29 per ton

PERMANGANATE OF POTASH NEEDLE CRYSTALS B.P.—In steady request at 5½d. per lb.

SODIUM BICHROMATE.—Firm at 3⅜d. per lb., with discounts for contracts.

SODIUM CHLORATE.—Firm at £24 15s. per ton with an improved demand.

SODIUM HYPOSULPHITE.—Commercial crystals £8 10s., photographic crystals £14 5s. per ton.

SULPHIDE OF SODIUM.—£10 5s. to £11 5s. per ton for solid, broken £1 per ton extra, carriage paid.

TARTAR EMETIC.—Firm at about 11d. per lb.

ZINC SULPHATE.—£11 10s. to £12 per ton.

Coal Tar Products

THE market for coal tar products remains very quiet, although inquiry is still maintained. Prices remain unchanged from last week.

MOTOR BENZOL.—Unchanged at about 1s. 5½d. to 1s. 6½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Remains at 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Unchanged, at 1s. 8d. per gallon for the 98/100% quality, and at 1s. 6d. per gallon for the dark quality, 95/97%.

NAPHTHALENES.—Quoted at £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Obtaining 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast port.

Nitrogen Fertilisers

Sulphate of Ammonia.—Export.—At present the market continues dull but prices remain unchanged at about £7 to £7 5s. per ton, f.o.b. U.K. port in single bags. It is anticipated that towards the end of the year buyers will commence covering their spring requirements. *Home.*—Home prices remain at £9 3s. per ton delivered in 6-ton lots to consumers' nearest station. Apart from fertiliser manufacturers, there is very little interest in this or other nitrogenous fertilisers.

Nitrate of Soda.—The position remains unchanged.

Latest Oil Prices

LONDON, November 12.—LINSEED OIL was steady for near but 7s. 6d. per ton lower forward. Spot, £26 6s.; November, £24 5s.; November/December, £23 10s.; January/April, £21 10s.; and May/August, £20 17s. 6d., naked. RAPE OIL was inactive. Crude extracted, £29 10s.; technical refined, £31, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £23 10s.; refined common edible, £28 10s.; deodorised, £30 10s., naked, ex mill. TURPENTINE was quiet at 3d. per cwt. decline. American, spot, 34s. 9d.; December, 35s.; January/April, 36s.; Russian, spot, 32s. 3d.

HULL.—LINSEED OIL.—Spot, £26; November, £25 10s.; December, £23 10s.; January/April, £22; May/August, £21 7s. 6d. East Indian, spot, £27 15s.; Baltic, spot, £28 10s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £22; edible refined, spot, £25 5s.; technical, spot, £25; deodorised, spot, £27 5s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £25 10s. per ton, naked. GROUNDNUT OIL.—Crushed extracted, spot, £28; deodorised, spot, £32 per ton. SOYA OIL.—Extracted and crushed, spot, £25; deodorised, spot, £28 10s. per ton. RAPE OIL.—Crushed extracted, spot, £28 10s.; refined, spot, £30 10s. per ton. TURPENTINE.—Spot, 37s. 6d. per cwt. CASTOR OIL and COD OIL unaltered.

South Wales By-Products

THERE is very little change in South Wales by-product activities. Pitch continues to have a slow market, with supplies well in excess of demand. Quotations are unchanged. There is a slightly better call for road tar, with values unchanged round about 13s. per 40-gallon barrel delivered. Creosote remains weak, but motor benzol has a fair and steady market, quotations of both products being unchanged. Heavy naphtha remains slow, but solvent has a moderate call. Refined tars continue to have a moderately good market, with prices unchanged for coke-oven and gasworks tar. Patent fuel and coke exports are better and prospects are brighter. Patent fuel prices, for export, are as follows:—21s. 6d., ex ship Cardiff; 20s., ex ship Newport; 20s., ex ship Swansea. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 26s. to 30s.; furnace, 17s. 6d. to 21s. 6d.

Scottish Coal Tar Products

CRESYLIC ACID prices have been reduced during the week and some fair orders have been placed. Other quotations are unchanged, although water white products tend lower owing to the lack of orders.

Cresylic Acid.—A few orders have been placed at reduced prices. To-day's values are lower, as follows: Pale, 99/100%, 1s. 7½d. to 1s. 8½d. per gallon; pale, 97/99%, 1s. 6½d. to 1s. 7½d. per gallon; dark, 97/99%, 1s. 5½d. to 1s. 6½d. per gallon; high boiling, 1s. 7d. to 1s. 9d. per gallon; all f.o.r. makers' works in bulk.

Carbolic Sixties.—There is no business passing, and value is purely nominal at about 1s. 10d. to 2s. per gallon for grades with under 5% water.

Creosote Oil.—Virgin oils continue in good demand. Specification oil, 2¾d. to 3d. per gallon; gas works ordinary, 3¼d. to 3¾d. per gallon; washed oil, 3d. to 3½d. per gallon; all ex makers' works.

Coal Pitch Tar.—Inquiries are scarce, and export value remains nominal at about 45s. per ton f.a.s. Glasgow. Home trade is also quiet at 45s. per ton f.o.r. makers' works.

Blast Furnace Pitch.—Only a few orders are being placed, and controlled prices remain at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Buyers are now taking some interest for delivery during the coming season. Meantime prices remain easy at 3d. to 3¼d. per gallon f.o.r. naked.

Blast Furnace Tar.—Unchanged at 2¾d. per gallon.

Crude Naphtha.—Available supplies obtain 4d. to 4¼d. per gallon in buyers' tanks f.o.r.

Water White Products.—Very few orders are passing, and quotations are weak. Motor benzole, 1s. 4¼d. to 1s. 4¾d. per gallon; 90/160 solvent, 1s. 2d. to 1s. 3d. per gallon; 90/190 heavy solvent, 1s. to 1s. 0½d. per gallon; all f.o.r. in bulk quantities.

Canadian Imports of Tartaric Acid

UNITED Kingdom exports of tartaric acid crystals to Canada during 1929 showed a decrease of over 100,000 lb. compared with the preceding year, while those of the United States and Germany were nearly trebled. Britain is, however, still the largest supplier, the figures, by countries of origin, being:

	1928. Pounds.	1929. Pounds.
United Kingdom	488,639	380,434
United States	60,422	145,026
Germany	83,706	213,252
Italy	61,504	23,743
Other Countries	25,248	37,880
Total	719,519	800,335

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, November 11, 1930.

THE Scottish heavy chemical market shows a slight improvement, mainly in home business.

Industrial Chemicals

ACETONE.—B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum 1-ton lots.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered free Great Britain in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¾d. per lb., ex store. On offer from the Continent at 3½d. per lb., ex wharf.

ACID, SULPHURIC.—£3 2s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11½d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £30 per ton, ex wharf. On offer for shipment from China at about £28 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £19 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £20 5s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or at £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £33 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¾d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¼d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid, buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £9 12s. per ton, carriage paid, buyer's sidings, minimum six-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices, 55s. per ton, ex works; 57s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

(*Continued from page* 463.)

Prices of Essential Oils

BOURBON GERANIUM OIL.—18s. per lb.

CINNAMON OIL LEAF.—6s. 3d. per oz.

CITRONELLA OIL.—Pure Ceylon, 2s. 5d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 9s. 9d. per lb.

LEMON OIL.—4s. 9d. per lb.

PEPPERMINT OIL.—Wayne County, 10s. 3d. per lb.

Canada's Production of Metals

Some Figures for 1929

ACCORDING to the Dominion Bureau of Statistics at Ottawa, zinc production in Canada in 1929 is now estimated as having reached 197,267,087 pounds. This, valued at the average London price for the year of 5·387 cents per pound, was worth $10,626,778. In 1928 the output of 184,647,374 pounds, valued at the average London price for the year of 5·4932 cents. per pound, amounted to $10,143,050.

Metallic bismuth was made in 1929 by the Deloro Smelting and Refining Company, Ltd., Deloro, Ontario, and by the Consolidated Mining and Smelting Company, Ltd., of Trail, B.C. The Deloro Company also exported a silver-lead-bismuth bullion for further treatment in United States smelters. During 1929 production in Canada of metallic bismuth and bismuth contained in exports amounted to 194,329 pounds, valued at $307,114, as against 14,002 pounds, worth $5,067 in 1928. Imports of metallic bismuth into Canada during 1929 amounted to 2,701 pounds, valued at $4,932, and 36,603 pounds of bismuth salts, worth $15,755.

The finally revised statistics on the production of lead show a slight decrease in quantity with an appreciable increase in value, as against the 1928 figures of 337,946,688 pounds, valued at $15,553,231.

Cadmium produced as a by-product of the silver-lead-zinc ore treatment at the Trail refinery of the Consolidated Mining and Smelting Company, amounted in value to $675,294, as against $341,374 during 1928.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, November 13, 1930.

Beyond the normal fluctuations in prices there have been few outstanding changes in prices on the chemical market here during the past week, the continued firmness in the case of arsenic being, perhaps the principal exception. With regard to business, a moderate amount of buying interest is being displayed in respect of new transactions, for the most part in connection with prompt and early delivery parcels, although a certain amount of interest is being shown forward. Contract deliveries of heavy materials for use in the textile finishing trades have been maintained at round about their recent level.

Heavy Chemicals

A fair trade is going through in the case of bicarbonate of soda, current values in this section remaining very firm at round £10 10s. per ton in contracts. Prussiate of soda also is well held at from 4¾d. to 5¼d. per lb., according to quantity, and a moderate business is reported. With regard to caustic soda, the demand keeps up at a fair level, and prices are strong at from £12 15s. to £14 per ton in contracts and according to grade. Chlorate of soda prices are still somewhat uncertain in tendency at from £23 to £24 per ton, and current sales are not very extensive. Phosphate of soda is moving off quietly, but offers of this material are reasonably steady at about £10 per ton, for the dibasic quality. A moderate business is being done in the case of sulphide of sodium, prices of which are at about £8 per ton for the commercial grade, and round £9 per ton for the 60–65 per cent. concentrated solid quality. Alkali is in fair request and quotations are steady at £6 per ton in contracts. Offers of saltcake are at about £2 15s. per ton, a fair movement being reported. The demand for bichromate of soda is maintained at about its recent level, and prices are steady on the basis of 3⅝d. per lb., less 1 to 3½ per cent. Hyposulphite of soda is in moderate inquiry, with the photographic material on offer at round £15 per ton, and the commercial grade at £9 10s.

The potash products are steady on the whole. Permanganate is held at 5½d. per lb. for the B.P. quality and 5¼d. for the commercial, a quiet trade being transacted. There is a fair movement of yellow prussiate of potash, which is firm at from 6¾d. to 7¼d. per lb., according to quantity. Clorate of potash is not particularly active with current values ranging up to about £25 per ton. Caustic potash and carbonate meet with a moderate demand, and there has been little alteration in the price position, from £28 10s. to £29 and £24 10s. per ton respectively, being about current rates. A fair inquiry is about in the case of bichromate of potash, offers of which are maintained on the basis of 4½d. per lb.

Sales of sulphate of copper this week have been of moderate extent, and at about £21 per ton, f.o.b., there has been little further change in values. Offers of arsenic are not too plentiful and at up to £18 10s. per ton at the mines, for white powdered Cornish makes, prices are definitely firm. Trade in the lead materials is on very moderate lines but prices keep up at the recently reduced levels, brown and white acetates being quoted at £34 10s. and £35 per ton, and nitrate at round £29. The demand for the acetates of lime is on a restricted scale, with the grey quality at £14 per ton and the brown at £7 5s.

Acids and Tar Products

Acetic acid attracts a moderate amount of buying interest, and prices are held at from £47 to £51 per ton for the glacial quality, and about £37 for the 80 per cent. commercial material. Tartaric acid is steadier at from about 1s. per lb., with citric acid still on offer at from 1s. 5½d. to 1s. 5¾d. There is a quiet demand about for oxalic acid, and values in this section show little change on balance at about £1 11s. 6d. per cwt., ex store.

Quiet bookings continues to be made in the case of pitch, and prices are nominally unchanged at 45s. per ton, f.o.b. Creosote oil is steady at from 4d. to 4¼d. per gallon, naked, at works, and a fair demand for certain grades is reported. Solvent naphtha is in moderate request at about 1s. 3d. per gallon, naked. Crystal carbolic is quoted at from 5½d. to 6¼d. per lb., f.o.b., according to quantity, and crude 60's at about 1s. 8d. per gallon, naked.

Company News

Nitrate Producers' Steamship Co.—An interim dividend has been declared at the rate of 7½ per cent. per annum, tax free.

Allen, Liversidge, Ltd.—A dividend at the rate of 6½ per cent. per annum (less tax), is announced for the six months ended October 31, 1930.

International Nickel Co.—It is announced that in spite of a sharp drop in net earnings for the third quarter of the year, the company are to pay the usual dividend of 25 cents per share on the common stock.

Unilever, Ltd. (formerly Margarine Union, Ltd. and N. V. Margarine Unie).—The directors have declared interim dividends of 4 per cent., less tax, on the ordinary shares in respect of the year to December 31, 1930.

Chemical and Wood Industries, Ltd.—The first report for the period from April 16, 1929, to August 31, 1930, shows a profit of £50,156, which has been allocated as follows: Income tax £11,334, 2½ per cent. dividend £19,336, reduction of preliminary expenses £10,000, leaving to be carried forward £9,486.

North Broken Hill, Ltd.—At the annual meeting of shareholders on October 31, held in Melbourne, the directors declared a dividend (No. 84) of 9d. (3¾ per cent.) per share, payable on December 8, to shareholders registered on November 8. This compares with 5 per cent. distributed in the previous quarter. For the corresponding period of 1929 a dividend of 2s. and a bonus of 1s. per share was paid, followed in March by a dividend of 2s. and a bonus of 6d. per share. In the June quarter 1s. 6d. was paid, making a total distribution for the year of 50 per cent., against 42½ per cent. in the preceding year.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal" have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Portugal.—The Lisbon Port Administration is calling for tenders, to be presented in Lisbon by November 21, for the supply of paint as shown below: 1,000 kilogs. of first coat paint ("tinta de fundo No. 1"); 1,000 kilogs. of second coat paint ("tinta de fundo No. 2"); 100 kilogs. of black paint in paste; 1,000 kilogs. of prepared ash-coloured paint (suitable for painting the outside of boats and for application on wood or iron); 1,000 kilogs. of white enamel paint (capable of withstanding repeated washing and also heat and damp). (Ref. No. B.X. 6,866.)

South Africa.—A firm of manufacturers' agents in East London desires to obtain the representation, on a commission basis, for the Eastern Province, of British manufacturers and exporters of shellac. (Ref. No. 432.)

Turkey.—The representation of manufacturers of alum is sought by a firm of agents in Istanbul. (Ref. No. 438.)

The Administration of State Railways and Ports in Angora is inviting tenders for the supply of 40 tons of calcium carbide by November 26 next. Local representation is essential, and the Department of Overseas Trade can provide the names of firms in Turkey who would be willing to act as agents for United Kingdom firms who are not already represented.

Uruguay.—The State Electricity Supply Works at Montevideo is calling for tenders, to be presented in Montevideo by December 10, for the supply of 260,000 kilogs of lubricating oils. (Ref. No. B.X. 6,863.)

Tariff Changes

Belgium.—As for October 27 licences are required for the import and transit of glues, oleine and stearine, when originating in the U.S.S.R.

France.—Glues and gelatine, oleine and stearine and oleic and stearic acid will, as from November 25, require certificates of origin for admission into France.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Deed of Arrangement

[The following deeds of arrangement with creditors have been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.]

KEARNS, Walter Edward, trading as J. AND W. KEARNS, Cowpe Mills, Waterfoot, dyer and bleacher. (D.A., 15/11/30.) Dated November 4, filed November 6. Trustee, L. Shaw, 46, Brown Street, Manchester. Secured creditors, £11,616; liabilities unsecured, £28,195; assets, less secured claims, £6,380.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

ANGLO-GERMAN PHARMACEUTICAL PRODUCTS CORPORATION, LTD., London, W. (M., 15/11/30.) Registered November 3, £250 debentures, balance of £750; general charge.

BRITISH SILK DYEING CO., LTD., London, E.C. (M., 15/11/30.) Registered October 29, £100,000 debenture stock (secured by Trust Deed dated October 21, 1930), present issue £90,000; charged on land and buildings at Bonhill, N.B., also general charge. *Nil. July 14, 1930.

BURTON (W.) AND SONS, LTD., Leicester, bleachers, etc. (M., 15/11/30.) Registered November 3, equitable mortgage, to Bank, charged on 10, Pike Street, Leicester. *£9,000. July 14, 1930.

London Gazette, &c.

Companies Winding Up Voluntarily

MINERAL RESIDUES, LTD. (C.W.U.V., 15/11/30.) By reason of its liabilities. M. Jenkins, of Llanidloes, solicitor, and D. R. Morgan, of Newtown, I.A., appointed as joint liquidators; confirmed by meeting of creditors, November 4.

VICTORIA OIL AND REFINING CO., LTD. (C.W.U.V., 15/11/30.) By reason of its liabilities, November 5. H. A. Leach, chartered accountant, Windsor House, Victoria Street, S.W.1, appointed as liquidator.

Notice of Intended Dividend

KEEVILL, Donald Frank, and KEEVILL, Arthur Gordon trading as KEEVILL, WEBB, FARDON AND CO., 39, Redcliff Street, Bristol, manufacturing chemists. Last day for receiving proofs, November 25. Trustee, H. Ashton, 26, Baldwin Street, Bristol, Official Receiver.

Partnership Dissolved

SOAR MANUFACTURING CO. (Henry TOWERS, Fred MARTIN and Hector William TOWERS), manufacturers of cleansing powders, etc., 1a, Victoria Road North, Leicester, by mutual consent as from October 6, 1930. Debts received and paid by H. Towers, who will continue the business.

New Companies Registered

THE CHISWICK POLISH CO. (OVERSEAS), LTD., Burlington Lane, Chiswick, London, W.4. Registered as a "private" company on November 3. Nominal capital, £1,000 in £1 shares. Manufacturers of and dealers in polishes, dressings, and blacking, whether for boots, shoes, waterproofs, waterproofing, furniture and floors, chemists, druggists, oil and colourmen, brush and pad makers, etc. Directors: A. L. Reckitt, W. H. Slack, P. B. Reckitt, J. McLaren, C. L. O. Cleminson, Mrs. K. M. Mason.

MOVIT LIMITED, Masons Buildings, Exchange Street East, Liverpool. Registered November 5. Nominal capital, £100 in £1 shares. Manufacturers of and dealers in rust and corrosion solvents of all kinds, oil, grease, fat and chemical manufacturers, etc. Directors: W. H. Huxley, F. C. Baker.

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to November 29, 1930.

METHASOL.

516,271. Class 1. Mineral dyes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. September 23, 1930. To be associated with No. 615,272 (2,744) iv.

WAXOLINE.

516,273. Mineral dyes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. September 23, 1930. To be associated with No. 516,274 (2,744) iv.

METHASOL.

516,272. Class 4. Dyes, not mineral and not for toilet purposes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. September 23, 1930. To be associated with No. 516,271 (2,744) i.

ALTEX.

615,277. Class 4. Raw, or partly prepared, vegetable, animal, and mineral substances used in manufactures. British Dyestuffs Corporation, Ltd. September 23, 1930. To be associated with No. 512,941 (2,725) i.

WAXOLINE.

516,274. Class 4. Dyes, not mineral and not for toilet purposes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. September 23, 1930. To be associated with No. 516,273 (2,744) i.

Economy in Fuel Consumption

A PAPER on "Graphical Methods of Fuel Control," by Jas. Cunningham, was read at a meeting of the Institute of Fuel, held at the Chemical Society's Rooms, Burlington House, Piccadilly, London, on Wednesday, November 12.

Dealing with the question of economy in fuel consumption, and the possibility of securing this by the establishment of suitable records, the author stated that the man who paid the bills rarely saw the furnace in which the fuel was used or was aware of its condition. If the bills were high, he was quite as likely to come to the conclusion that the fault lay in the price of the fuel as that it might have something to do with his plant or the personnel of his works.

Complaints on this score are often really largely due to excessive consumption from various causes, such as unsuitability of the apparatus for the duty actually required, or faulty adjustment. It was a common experience that greater economies could be effected in cost by attention to the quantity of fuel consumed rather than by such small reductions in the price of the latter as were usually possible. Where the fuel was prepared in the works, as, for instance, by the use of gas producers, economy in consumption should be secured before engaging in extensive alterations in the production equipment or methods, since the whole aspect of the situation might be completely altered. While, however, seeking to reduce the cost of fuel, it must not be overlooked that this was only one item of the total expenditure, and that, while high capital expenditure might result in low cost of unit production under suitable conditions, if the use factor was low the ultimate cost would be less with plant of lower heating efficiency and higher fuel consumption.